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DRAFT MINUTES OF THE 1985 MARK MEETING

February 21, 1985 -- Portland, Oregon

I. Preliminary Business

A. Introductions

Six new Committee members were introduced at the start of the meeting:

Margaret Birch (CDFO)	replacing	Don Bailey
Scott McCutcheon (NMFS-Pasco)	replacing	Donn Park
Kit Rawson (ADFG-Anchorage)	replacing	William Hauser
Lin Roberts (ODFW)	replacing	Ken Hall
Art Tautz (BCFB)	replacing	David Narver
Frank Thrower (NMFS-Alaska)	replacing	Alex Wertheimer

L. B. Boydstun, CDFG harvest manager, was present for part of the meeting in the stead of Ron Pelzman who has taken a new position. CDFG will name a new tag coordinator in the near future. Much appreciation is acknowledged for the hard work and contributions of each of the above former tag coordinators!

A list of Committee members and other meeting participants is provided in Attachment 1.

B. Approval of 1984 Mark Meeting Minutes

The revised minutes of the 1984 Mark Meeting were approved by the Committee. The initial draft minutes had been revised to include more current estimates of steelhead interceptions by the Japanese gillnet fleets and a more accurate description of negotiations for a catch quota of chinook.

II. Update on OCZMA Proposal to Ad-Clip Hatchery Coho in OPI for Selective Harvest Management

Jim Martin, harvest manager for ODFW, briefed the Mark Committee on the present status of the Oregon Coastal Zone Management Association's (OCZMA) proposal to adipose clip hatchery coho in the OPI for selective harvest in the ocean. The specific area is from Cape Leadbetter south and includes the Columbia River and Willapa Bay hatcheries.

As background, Martin noted that the effects of El Nino and poor upwelling in the last few years have contributed greatly to the severe reduction seen in coho production in the OPI. Since the ocean fishery is comprised of 75-80% hatchery and 20-25% natural production, fishery managers have attempted to rebuild the natural stocks by sharply reducing ocean

harvest. As a consequence of the accompanying economic hardships experienced by coastal communities, the OCZMA took the initiative and proposed an adipose clip strategy for selective harvest similar to that now used in the Columbia Basin for steelhead.

An analysis of the proposal was completed recently by a special task team from ODFW and WDF, with assistance provided by PMFC. The report is available from ODFW headquarters and is titled, Analysis of the Selective Harvest of Hatchery Coho Salmon in the Oregon Production Index Area (OPI). Technical assumptions and analyses are provided along with conclusions regarding various management scenarios and probable impacts upon research programs (including coded wire tagging) and other agency programs. The report also includes a partial economic analysis.

Martin reviewed the six recommendations that were made in the report by the analysis team:

1) Any decision to be made by ODFW should be deferred until at least April 18, 1985.

   - The reason for this is that ODFW is also involved in a general review of the coho salmon management plan. Several of the policy level issues (e.g. inland/ocean allocations, commercial/sport allocations) need to be clarified before determining whether the OCZMA proposal is a good technical way to proceed. (*See note below)

2) Allocation goals for inland fisheries need to be developed and implemented.

   - Implementation of the proposal would shift allocation from inland fisheries to ocean fisheries at low stock sizes. An explicit ocean vs. inland allocation policy does not exist at this point. Rather, allocation has been handled indirectly by the need to protect an adequate escapement of wild stock.

3) Specific plans for harvest management and potential production shifts in Columbia River hatcheries to achieve treaty harvest goals need to be developed and implemented.

   - Presently the main constraint for managing coho fisheries south of Cape Falcon (most of OPI area) is the need to get an adequate escapement of Oregon coastal natural stocks. However, the OCZMA fin clip proposal may not be a rational management plan to meet U.S.-Canada treaty commitments north of Cape Falcon, and possibly south of Cape Falcon as well. Hence, clarification is needed on what the main constraints will be for managing coho once the treaty is implemented.

4) Allocation of ocean salmon catch between recreational and commercial uses should be reexamined to ensure that economic and social benefits are optimized without reduction in productivity and increases in waste.

- One of the major objectives of the OCZMA proposal is to increase ocean economic benefits, particularly from the hatchery programs. The actual method for doing this, however, needs careful review. Some maintain that the sport fishery generates many more dollars for the coastal communities than the commercial fisheries. Thus, it may be possible that a change in managment policy could achieve the same desired result without spending roughly two million dollars on the fin clipping program with its attendent mortality for hooked but nonharvestable wild fish.

5) A more comprehensive and refined approach to identifying the economic effects of various management alternatives is clearly needed for the future.

   - An adequate economic analysis is not yet possible. Fin clipping costs, etc., can be estimated along with estimates of the mortality impact. However, it is unclear what would happen if private aquaculture drops out of the system. Similarly, it is not clear what might happen if there was a major shift from the north to the south in the distribution of economic benefits. An economic comparison of gillnet benefits versus ocean troll benefits also is needed.

6) The adipose clip should remain sequestered for the CWT program.

   - In the event that ODFW Commissioners elect to implement the program, the recommendation is that a ventral fin be used in place of the adipose clip. The U.S.-Canada treaty commitments and the regional CWT program make the use of the adipose clip for coded wire tags a high management priority. Thus the CWT program should not be disrupted when another fin can serve the same function.

Martin also emphasized that a tremendous amount of disagreement exists over some of the fundamental assumptions in the analysis. Three major areas of disagreement are:

1) Hooking mortality

   Some believe that the 30% mortality value used in the analysis is far too high and that it probably is in the range of 5%. Many more others believe that it is really in the range of 50%-80% and thus completely unacceptable as a management strategy. The actual mortality range remains to be determined.

2) Mortality rates resulting from fin clipping

   There is general agreement that fin clipping and added handling result in increased mortality to hatchery stocks. However, opinions on the level of impact range from very minimal to 10% or more losses.

3) Cost-benefits

The program is estimated to cost $1.3 million for start up and $1.1 million per year for the next few years. However, the analysis shows that the program is the best option only in years of intermediate or low stock levels. Since marking must be done three years before the fishery occurs (e.g., mark 1985 brood for the 1988 fishery), it is impossible to accurately project in advance if the fin clip management approach will be needed.

Note: A public hearing on the OCZMA proposal was held by ODFW in Portland on the afternoon of February 21. The ODFW Commissioners decided at that time to defer making any decisions until April 18 as recommended by the analysis team. The Commissioners also requested that seven additional analyses be carried out (e.g., model system, assuming loss of private hatchery; model system separately for commercial and sport fisheries; etc.). However, Dr. Jack Donaldson (Director, ODFW) subsequently requested (February 26, 1985 memo to Commissioners; see Attachment 2) that the new analyses be deferred until after the PFMC 1985 season's process is completed. The reason for the delay is that individuals who would do this major project are now working full time and more to develop 1985 salmon season possibilities for the PFMC process. Hence, a finclipping decision may not be made until sometime this summer.

III. Status of Backlogged Recovery Data and Projected Completion Dates

A. Current Status and Goals

The current status of CWT recovery data was reviewed by Ken Johnson (PMFC). Actual or projected dates for data submission, processing, and distribution are summarized in Attachment 3 for 1977 through 1984.

Tremendous progress was achieved by all agencies during the past year in reporting recovery data. As a result, the 1980, 1981, and 1982 recovery reports were distributed (lacking California data). In addition, California reported recovery data for 1978, 1979, 1980, and 1981. The 1978 and 1979 data have been processed and distributed, thus completing the recovery reports for those years. The 1980 and 1981 data will be processed and distributed in the near future.

On the basis of current progress, the 1983 recovery report is expected to be available in July, 1985. The 1984 report should also be completed by January, 1986. California data are expected to be available as well for these years. Special thanks are due to L.B. Boydstun and his staff for an outstanding job in overcoming several years of backlogged data.

Progress also has been substantial on reporting hatchery recoveries. WDF, USFWS, and NMFS-AK are now reporting these data. ODFW is very close to reporting public hatchery recoveries for 1984. Data for earlier years will then be processed as time permits. IDFG likewise expects to be able to report within the next six months all Idaho

recoveries for prior years. Boydstun (CDFG) reported that California data are available back through 1977 and will be reported. (It was not realized that these latter data also were desired.) Margaret Birch (CDFO) noted that Canada does not now have the ability to report hatchery data. However, CDFO is now going through a standardization process and will work back through the existing data as time and funds permit.

B. Processing Rare-Earth Tags

Scott McCutcheon (NMFS-Columbia River) reported that the X-ray reader equipment used for decoding rare-earth tags has been moved to Pullman, Washington and must now be used there. Therefore, NMFS proposed to defer decoding any rare-earth tags until June, 1985 when all recoveries should be in (rare-earth tags only released in 1979 and 1980). Blankenship (WDF), however, noted that this schedule would prevent several agencies from meeting their goal of reporting 1983 and 1984 tag recoveries to the RMPC by June. McCutcheon agreed and said that the tags would be decoded in April if all agencies would promptly forward any rare-earth tags yet in their possession. This request was readily agreed to by all concerned.

McCutcheon also noted that NMFS-Seattle will no longer release rare-earth tags in the future.

IV. Report on Coastwide Stock Identification Study

Roy Wahle (PMFC) reported that he is nearing completion of his contract to develop a coastwide plan for tagging key stocks for fishery management purposes. The report will be distributed in March for preliminary review by members of the Oversight Commmittee. Following this review, the report will then be finalized and made available to all interested.

Tasks assigned to Wahle for development of a coastwide stock identification plan were:

1) Identify hatchery and natural stocks of chinook and coho salmon coastwide.

2) Identify established management units and define the assumptions and criteria used.

3) Determine coded wire tagging efforts to date, looking at both hatchery and natural stock tagging.

4) Make recommendations concerning future needs for stock identification requirements for hatchery and non-hatchery stocks.

5) Describe problems not resolved with coded wire tagging.

6) Identify alternatives to coded wire tagging.

Wahle noted that the report contains a number of sections. A major section lists and describes existing chinook and coho managment areas or units, fishery by fishery. Each stream from Alaska to California that enters saltwater and produces chinook or coho salmon is enumerated. This list contains estimates of the average number of spawners in these streams in recent years. Hatchery facilities are identified with the respective production in millions of fish.

The lists are broken down in areas which can be separated by important geographical landmarks, with the streams listed from north to south. The most northerly is the Kukpuk River which enters marine waters in Alaska where the Chukchi Sea ends and the Arctic Ocean begins. The most southerly is the San Lorenzo River which enters Monterey Bay, California. Alaska is divided into ten areas, Washington five areas, one for Oregon coastal streams, and two for California streams.

The study contains an analysis of binary coded wire tagging from 1971 forward, summarized by agency for marked hatchery and non-hatchery fish. It also reports on studies with potential to be used for stock identification purposes. Two promising methods of stock identification (genetic stock identification using electrophoresis and scale pattern analysis using a microcomputer) are also reviewed.

The genetic stock identification method (GSI) is a two-stage process. The first stage involves obtaining baseline data on genetic profiles of populations that are potential contributors to a particular mixed stock fishery. The second step uses a computer program to obtain actual estimates of mixed stock contributions through a statistical procedure called maximum likelihood.

The scale pattern analysis method of stock separation is based on the assumption that fish from a particular region or stock grow in a characteristic manner. This characteristic manner is reflected in the number and spacing of the circuli on scales. This method, like the GSI method, is a two-stage process. First, scales are collected from known stocks of fish, either the standards or a learning sample. The number and spacing of the circuli of these standards are then put into a computer readable format by employing a digitizer and encoder. The encoder is connected to the digitizer to make it easier to enter measurements by remote control. The second stage of scale pattern analysis consists of comparing scales from the standards, or known stock scales, to that of scales of unknown stock origin. This is accomplished by using a discriminate function model.

Much of the development of both the genetic stock and the scale pattern method of stock separation has been accomplished by independent efforts of agencies and universities. This approach often results in non-standardized collection and analysis techniques. Nevertheless, both methods of stock separation have much potential for in-season management of mixed stock fisheries. Furthermore, both methods can be complimentary to each other, as well as to the coded-wire tag. They can also be useful in wild or natural spawning stock identification. However, a coordinated systematic coastwide program is needed to realize the full potential of both methods.

Finally, Wahle noted that the report contains recommendations as to future needs and stock identification for both hatchery and non-hatchery fish from Alaska to California. This was accomplished by going through the inventory tables and the estimates of spawners and hatchery production of all chinook and coho streams coastwide.

V. Report on CWT Statistical Research Study

Frank de Libero (WDF/PMFC) reported on a few of the highlights obtained while analyzing the statistics of the coded wire tag.

A. Need for Replication--Hatchery Perspective

Substantial effort was invested last year in identifying bona fide replicate CWT studies from the hatchery perspective. In the process, many tag codes formerly identified as replicate studies were reclassified. However, de Libero noted that the end result was a good set of replicated data to study internal variability of coded wire tag data.

Abernathy and Big Creek Hatchery replicated studies were analyzed and then compared to the rest of the replicated studies. The result found was that theoretical models (binomial or hypergeometric) give estimates of variability that are perhaps 2-3 times too low. Therefore, de Libero emphasized that if one wishes to get a realistic estimate of the variability associated with the recovery data, tag codes ought to be replicated within a group of fish before they are released.

B. Need for Replication--Fishery Perspective

The second phase of de Libero's study was to load approximately 445,000 recoveries and 3,400 release records for 1971-1977 brood chinook and 1971-1978 brood coho tag recoveries onto SIR/DBMS, a data base management system at the University of Washington. The purpose was to examine variability from a fishery (time/area) perspective. Seven replicated groups (other than the Abernathy and Big Creek groups) were selected on the basis of comparable release numbers (i.e. total tags released differed less than 500 between replicates, and total numbers released were in excess of 20,000).

The end result was that the recovery data are at least as variable or more so in the fishery than when looking at overall survival rates. Furthermore, the variability of the data was in itself highly variable. This was demonstrated by a handout which summarized 1975-1981 Robertson Creek chinook tag recoveries by year, catch area, and month for both the Alaska and British Columbia troll fisheries. (A copy may be obtained from de Libero or PMFC).

de Libero declined to offer specific recommendations on the number of fish to tag or number of replicates to use, etc. He noted that his report will contain recommendations and specific examples when it is ready for distribution (projected for May or June, 1985). However,

replication was again emphasized as a general statement, with at least three tag codes recommended as a working rule. Some people felt that more than six codes presents logistic problems.

C. Apparently High Recovery Rates of Tagged Fish

de Libero also noted that based on preliminary analyses, the CWT sample recovery rate appears to be much greater than expected. Using recent Oregon data, a total of 5,442 marked coho were observed in a total sample of 107,453 fish. This gave an unadjusted in-sample mark recovery rate of 5.1%. However, Oregon has never had an overall tagging program of that magnitude. A 2-2.5% recovery rate would be more likely.

This apparent discrepancy was then examined for all 1978 and 1979 brood coho released from Washington hatcheries (including USFWS and tribal releases).

	1978	1979
Numbers released	53.3 million	62.4 million
Numbers tagged	1.8 million	1.6 million
Percent tagged	3.4%	2.6%

Only taggable coho (larger than 250/lb) were included in the analysis. If releases of smaller sized fish and wild fish were included, the overall recovery rate might be expected to drop to 2-2.5%. This was not found to be true, however. (Note: Since the Mark Meeting, the estimate of the number of tagged fish released was found to be in error. The analysis is being redone.)

Using 1981 and 1982 recovery data primarily from the ocean troll and Puget Sound net fisheries, the mark/sample data were:

Recovery Year:	1981	1982
Total Marks Recovered:	27,926	15,247
Total Coho Sampled:	477,199	308,097
Percent Marks Recovered:	5.85%	4.95%
Percent Tags Recovered:	5.40%	4.50%

de Libero offered several possible explanations for the unexpectedly high rate of tag returns. The most plausible reason is that the number of untagged fish released from the hatcheries is substantially overestimated. It is the only number in the above table, for example, that is not directly quantified. Typically, total release numbers are derived by subtracting observed mortalities from the initial egg count.

Another possibility is that tagged fish have a higher survival rate and thus inflate the recovery rate. This could result from either a selection bias prior to tagging or a preferential rearing bias after selection and tagging. However, a comparison of survival rates of Washington production codes (i.e. normal hatchery practices) with "other" categories of tagging studies (i.e., experimental) does not support this hypothesis. In actuality, the production codes averaged 4.92% survival to the fisheries as compared to 3.85% for the "other" category.

A third possibility might be sampling bias which favors too many marks in a sample. For example, a sampler might have a non-procedural stopping rule whereby sampling concludes after a predetermined number of marks are observed.

A fourth hypothesis offered is that fisheries may target on tagged salmon. The rationale for this explanation is that CWT data are an important component in the WDF/NBS model used to help establish coastwide harvest regulations.

In conclusion, de Libero noted that the most likely reason that the sampled tag recovery rate for coho appears to be much greater than the tagged to total release ratio is that the number of untagged fish released is over-estimated. Further research was recommended into this potential problem.

VI. Development of Regional On-Line CWT Data Base

A. Interim Solution for Timely CWT Recovery Data

L. B. Boydstun (CDFG), a member of the PFMC Salmon Team, spoke briefly to the Mark Committee and presented a recommendation for reporting preliminary recovery data during the interim while an on-line CWT data base is being developed. He noted that the Salmon Team meets each year during the months of January to April to assess the stocks and fisheries, and to develop recommendations for the forthcoming season. The Council then decides what regulations will be implemented.

Boydstun emphasized that because of the need for time management, the Salmon Team must rely upon preliminary tag recovery data from the preceding season to evaluate contribution rates to the fisheries. This is in contrast to most research programs which can wait for finalized data.

Boydstun further explained that each State now provides the Salmon Team with preliminary expansion data. However, the individual reports are not in standard format and thus necessitate many hours of hand tallying to obtain the desired summary data. To solve the problem, he requested that each State forward its preliminary data on tape to the Mark Center by January 1st so that it could be summarized in standard PMFC format. The data would then be distributed to the Salmon Team and other management entities by February 1st. While the request was

limited to ocean fisheries data for the PFMC area, Boydstun emphasized that it would be desirable for the entire coast. He also noted that California was prepared to commit to reporting its preliminary data by January 1 to the RMPC.

During the following discussion, Dick O'Connor (WDF) emphasized the California proposal was not a security problem since the preliminary data are now being provided to the Salmon Teams. Rather it was a question of routing the data through PMFC to standardize the format. Johnson (PMFC) added that the Mark Center would be more than willing to provide this needed service. Furthermore, to avoid any impressions that the data are final, the PMFC reports would be distributed as computer printouts rather than in the usual three-ringed binders.

This proposal was agreed upon by all recovery agencies, with the goal of reporting 1985 preliminary recoveries by January 1, 1986. However, it was also agreed that the long range goal of finalizing data within six months was still in effect.

B. Review of NWIFC Proposal

The Northwest Indian Fisheries Commission (NWIFC) proposed in December, 1984 that PMFC coordinate the development and implementation of a regional on-line CWT data base management system. In reviewing this proposal, Johnson (PMFC) noted that it was in part an outgrowth of substantial discussion on the subject during the February, 1984 Mark Meeting. However, PMFC opted at that time to await results from Frank de Libero's research so that the SIR/DBMS data base at the University of Washington could be evaluated as a suitable data base management system. These results are now largely available (see Section E.2 below) and demonstrate the suitability of SIR/DBMS as one possible means of achieving an on-line regional data base.

A second and more pressing reason for the NWIFC proposal was that tribal biometricians had experienced substantial difficulty in obtaining "raw" recovery data needed for various statistical analyses. This latter problem resulted from the fact that both the WDF regional data base and the SIR/DBMS regional data base contained aggregated or restructured recovery data to meet specific management and/or research objectives. A further complication was that while the RMPC regional data base does consist of "raw" recovery records, the data required by NWIFC could not be provided because recoveries are filed by agency and year (batch mode) due to memory and speed limitations of PMFC's minicomputer. (Note: this latter problem is being rectified--see Section E.1).

C. Preliminary Meeting on NWIFC Proposal Reviewed

The results of a preliminary scoping meeting (January 9, 1985; Olympia, WA) on the proposal were reviewed for the benefit of those who did not participate. The meeting was held to determine what was feasible and to expedite discussion during the Mark Meeting. Those in attendance were experienced in data processing and the use of CWT data for management and research needs.

Johnson noted that the consensus of the meeting participants was that an on-line regional CWT data base was necessary and that it consist of the "raw" individual records after the necessary error checks have been done. However, the role of PMFC to accomplish this goal was called into question by WDF since the U.S.-Canada treaty (Memorandum of Understanding) language also stipulates the development of a "...coast-wide stock assessment and management data system, including catch, effort, escapement, and coded-wire tag data..."

In response to this concern, Johnson emphasized that for PMFC, the overriding concern was not who maintained and coordinated the data base but rather that it be established because of its tremendous value to the fisheries community as a whole. Therefore, PMFC is committed to doing all that it can to support this effort, regardless of where it ultimately resides.

While recognizing the potential for duplication, meeting participants recommended that PMFC sponsored ad-hoc committee efforts continue since some of the same individuals will be involved in either case. The group then identified the basic objectives of the desired on-line data base, with the recommendation that the list be reviewed by the Mark Committee. It was further recommended that a system analyst then be contracted to design the system to meet those needs.

D. Discussion and Actions Taken During Mark Meeting

The Mark Committee was in general agreement with the results and recommendations of the January 9th scoping meeting. However, little new progress was achieved because of the uncertainty introduced by the rapidly progressing U.S.-Canada treaty ratification process with all of its ramifications.

Blankenship (WDF) stated that Washington was reluctant to proceed further on the regional data base and have a system analyst contracted because of the duplication of effort it would entail. While not disagreeing that an on-line data base would be extremely helpful, he estimated that around 95% of all needs could be met by the present system through PMFC if agencies met the newly agreed upon goal of reporting all preliminary tag recoveries of the prior season by January 1 (see Section A above) and if standardization was pushed farther.

Crandall (ADFG) concurred that the U.S.-Canada negotiations would likely be the avenue for any decision on establishing a regional data base. However, she emphasized that Alaska was not concerned about the site of the data base (provided that an oversight committee is established) but rather that it be developed and made available to all.

Given the momentum of the U.S.-Canada treaty, the Mark Committee chose to await its outcome rather than proceed further with efforts to define data elements of the proposed regional data base. Wright (NWIFC), however, expressed serious concern at this development. He

noted that de Libero had made substantial progress on developing the SIR/DBMS data base since the NWIFC proposal was drafted in December, 1984. As a result, much of NWIFC's needs can now be met. Therefore, he disputed the prevailing assumption that a big commitment was necessary and recommended instead that time be spent looking at the features of SIR/DBMS. This was done (see Section E below).

E. Possible Options for On-Line CWT Data Base

The PMFC regional data base and the SIR/DBMS data base at the University of Washington were investigated in some depth as possible sites for the proposed regional on-line data base. Advantages and disadvantages of both data base management systems are discussed below. Subsequent time limitations prevented the further exploration of British Columbia's VAX data base as a third possibility.

1. Use Existing PMFC Database System

There are several advantages to using the existing PMFC data base:

a. The data base and software are already in place for providing for many of the data needs identified by users. Only minimal programming (2-3 months at most) would be required to accommodate the entire expanded data base.

b. The existing operating system is a powerful, interactive relational database management system (PICK), and includes among other features,

- Dynamic file structure with variable length fields, records, and files
- Powerful English-like query language simplifying data entry and retrieval, and minimizing programming
- Selectable report formatting capabilities

c. Only minimal hardware and software costs would be needed to make this database capable of handling the entire set of recovery records from 1971 onward and generating across-year brood reports. This could be done by tag code from either the hatchery or fishery perspective. (Note: programming is currently underway to provide this capability.)

The most serious disadvantage, however, is that significant funds would be needed to make the data base truly on-line. To do so, it would be necessary to purchase additional disk space, a more powerful processor, communication equipment, and expanded programming for user-friendly interface menus. The estimated cost for a "super-minicomputer" that could readily do the job (e.g. Ultimate) is $180,000 plus an additional $20,000 for printers, terminals, modems, etc.

Probably the only other disadvantage of any consequence is that the PICK operating system has been designed for business and does not have the extensive statistical packages such as SPSS. However, software does exist that allows PICK systems to communicate with VAX's, etc. Thus data sets could be selected and downloaded if necessary to another computer.

2. SIR/DBMS - University of Washington

The second option considered was to load all raw CWT data onto the SIR/DBMS data base management system now used for analyzing a substantial fraction of the existing data (1971-77 brood chinook; 1971-1978 brood coho). de Libero described SIR/DBMS in very favorable terms and noted many advantages in its design for efficiently handling CWT data.

a. The design is oriented toward release information for accessing recovery records. For example, there are 3,400 tag release codes and 445,000 recoveries in the research data base. This would increase to approximately 9,000 tag codes and over a million recoveries if all release and recovery data were loaded. The advantage of this design and the DBMS is that the release and recovery information are together and the data are independent of application.

b. SIR/DBMS is designed to accommodate huge data sets. For example, the 445,000 recovery records only require 1/2 of the disk pack. In addition, the entire data set could be stored on tape. Subsets could then be pulled off as needed for loading onto disk.

c. Cost of data retrievals are reasonable. For example, it cost $60 for a night run ($100 day charge) to process all Columbia River hatchery codes recovered coastwide.

   Another example was the cost incurred to retrieve all coho recoveries for the Washington ocean troll for 1971-1978. A total of 37,177 records were processed for $13.55 (weekend rate). A regression on the cost of a variety of runs gave an average day time cost of $9.00 plus 35 cents per 100,000 records processed. (Note: de Libero did the above work following the Mark Meeting in response to a challenge to demonstrate that recoveries could be processed from either the release or recovery perspective).

d. Statistical procedures are available as part of SIR/DBMS. (See aforementioned Robertson Creek handout.) In addition SPSS, SAS and BMDP system files can be generated.

e. SIR/DBMS has an EXPORT/IMPORT utility that allows the transfer of a CWT data base between different machine types. For example, the CWT data base can be directly transferred from the CYBER at the University of Washington to a VAX, providing the VAX has the SIR/DBMS installed.

f. Work to date on SIR/DBMS has shown that it is fast, efficient, and capable of producing brood year reports from either the hatchery or fishery perspective.

O'Connor also commented that WDF had done some comparative data retrievals using the WDF and SIR/DBMS data bases to determine relative costs. The result was that SIR/DBMS retrieval and report costs compared favorably with WDF production reports. As a result, WDF intends to critically evaluate SIR/DBMS over the next year as a potential replacement system. This evaluation will be carried out regardless of what transpires with the regional CWT data base effort.

g. Communication hardware and networking (TELENET) are already in place to facilitate off-site use of the data base. This is in contrast to the PMFC data base where additional expenditures would be needed to achieve this capability.

The only major disadvantage appears to be that SIR/DBMS is difficult for the infrequent user to learn. As such, some programming work will likely be needed to develop a user friendly menu system for accessing the data base. However, SIR/DBMS provides some packaged aids to simplify access to the data (SIR/SQL+) and the building of data input routines (SIR/FORMS).

Another disadvantage is that the cost of data retrieval, storage, and file maintenance may be substantially greater than if the computer is owned "in-house".

VII. Review of Coded-Wire Tagging Procedures Manual

Committee members briefly reviewed copies of a substantially revised version of the CWT procedures manual that had been initially produced in 1983 following the two 1982 CWT workshops. Johnson noted that the first version had a great deal of redundancy because the chapters on stock assessment studies and multiple comparison studies had been designed to stand alone. This redundancy has now been removed and the entire manual is much more cohesive.

The revised manual is divided into five chapters. Chapter 1 provides a general overview of the entire CWT program and is designed for the benefit of administrators and program managers. Chapter 2 provides a review of specifics on coded wire tagging and fin marks, plus a summary of regional agreements. Chapters 3 and 4 serve as technical reference for carrying out stock assessment studies and multiple comparison studies, respectively. Chapter 5 has not been completed yet, but will deal with sampling and tag estimation procedures.

A few major holes remain in the manual. The most serious is the need for an adequate discussion of recommended ways to determine the number of fish to tag in order that the recovery data are at adequate levels and

statistically reliable. It was emphasized that work by Frank de Libero, Bob Vreeland (NMFS), and others will be added to the manual as results become available.

The Mark Committee agreed to review the manual for content, accuracy, style, and readibility. Editorial comments were to be forward by the end of March.

VIII. Report on 1984 Actions of CWT Documentation Committee

Lee Blankenship, as chairman, reported the activities of the ad-hoc CWT Documentation Committee during 1984. He noted that the committee had been organized during the 1984 Mark Meeting and given specific charge to standardize documentation procedures for CWT studies. A meeting was held in Olympia on March 15, 1984 to identify objectives for a regional documentary data base and to define minimum needs for that data base.

It was found that most agencies had already started this effort. However, the level of detail and amount of information in the respective data bases varied substantially, depending on whether management or research needs were the primary objective. It was recognized that both approaches were valid because of the differences in informational needs between agencies. Accordingly, the Committee agreed that these existing data bases need not be standardized. In addition, all other tagging agencies are requested to develop an "in-house" documentary data base for tagging studies.

The Committee also recommended that key elements of each tag code release (i.e. early life history) be summarized and provided to PMFC. These key data items are:

1) Study purpose
2) Stock
3) Nature of study
4) Was the rearing and release as planned or were there complications that should be considered in evaluating the study?
5) Name of principle investigator

The stock and study type information will be included in PMFC's annual CWT Release Report along with the other tagging data. New codes, adopted from British Columbia, will now be used to report study type in the limited space available. These codes are as follows:

I = Index or marker stock
P = Production
E = Experimental
B = Both production and experimental
W = Wild

These changes have been implemented for the 1985 release report (i.e. releases through 1984).

Following Blankenship's presentation, John Meyer (USFWS) asked if there was a standard convention for identifying stocks in cases where eggs or fry are transported into a new river system. No one, however, had a clear cut solution to the universal problem. The general approach has been to identify such fish as unique stocks until they become blended with the resident fish. At that time, the stock generally is referred to as mixed.

IX. Report on ADFG Feasibility Studies Using Half Length Tags to Mark Pinks and Sockeye

Kit Rawson (ADFG) reported that five hatcheries will soon be producing 15 million pink salmon a year in Prince William Sound, while natural stock returns are between 10 and 20 million. Given the growing need for management, ADFG has carried out several studies since 1982 on the feasibility of using half length tags to mark pinks and chum. Specific objectives included information on tag application, short-term and long-term tag retention, short-term and long-term survival, and feasibility of automatic detection. The studies on pink salmon were conducted at Kitoi Hatchery near Kodiak and Tutka Hatchery near Homer, Alaska.

A. Tag Application

Newly emergent fry (1,600-2,000/lb) were found easiest to tag because of uniformity of size. However, some problems were experienced with the quality control device (QCD) rejecting fish which did have a tag. Average tagging costs per tag was $0.13 at a rate of 500 valid tags/hour for two crew members.

B. Short-Term Tag Retention and Survival

Twenty day tag retention rates ranged between 93% and 97% for studies done in 1982 and 1983. In both years, 20 day survival was greater than 99% for both controls and experimental groups.

C. Long-Term Tag Retention

The Kitoi fishery and egg takes were sampled in 1982 and 1983. A total of 235 fish with missing adipose fins were recovered in 1983, with 74% having a CWT. In 1984, a total of 120 "adipose clipped" fish were recovered, with only 50% having a tag. Double fin mark experiments (Ad clip + RV) in the Tutka fishery generated comparable rates of adipose missing adults bearing tags. As a result, it was hypothesized that between 25% and 50% tag loss occurred. Naturally occurring adipose clips were discounted as a major cause since the adipose-ventral marked fish were recovered at the same rate as the Ad-only fish.

This explanation, however, was challenged by several individuals. Blankenship noted that while he wasn't familiar with the rate of naturally occurring adipose "clips" in pink salmon, it was on the order of 0.05% for wild populations and 0.5% for hatchery reared populations of chinook, coho, and chum. Therefore, when sampling for an expected small adipose mark ratio, the naturally occurring marks (5 per 1,000 fish) will occur in significant numbers relative to the

number of tagged fish present in the sampled population that actually shed a tag. Dr. Keith Jefferts (NMT) concurred with this observation and noted further that the number of apparent adipose clips in a recovery sample is really a measure of how many fish either lost an adipose fin or a CWT.

There was, however, no explanation for the additional observation that Ad/LV marked fish were recovered at the same rate as the Ad-only fish. Further investigation is required into this entire matter.

D. Automatic Tag Detection

An automatic tag detector was used in Kodiak to recover pink salmon heads containing a tag. A number of heads indicated positive on the detector but proved to only have foreign material that was magnetic in nature. It took longer to determine that such tags did not contain a tag than it did to find a tag in a head containing one. The problem with foreign material will need to be solved before automatic tag recovery will be successful on a large scale.

X. Update on Advances in Microtag Technology

A. Update on Binary Tags

1. New Wire for Half-Length Tags

Dr. Jefferts (NMT) reported that detection problems experienced with half-length tags appears to have been resolved by replacing the stainless steel wire with a platinum/cobalt alloy wire. The new wire has excellent magnetic properties, making half-length tags as easily detected as stainless steel full-length tags. WDF is now conducting a pilot study.

2. Imbedded Replication

Dr. Jefferts indicated that tag code replication (i.e. a series of repeating codes) appeared possible on a wire spool and would avoid the problem of trying to randomize tagging on site by rotating tagging personnel, etc. However, he cautioned that it was not a simple exercise and considerable thought would be required to avoid potential problems with decoding and data processing.

After a rather lengthy discussion, it was agreed that WDF and CDFO would cooperatively design studies to evaluate the effectiveness of randomized replication by imbedded tag codes with that of the usual on-site methods. Dr. Jefferts was given approval to make the necessary modifications, with the understanding that an unused agency code would be used for this specific purpose. In addition, new decoding rules might be required to recognize the replicates of a given imbedded code.

B. Passive Integrated Transponder (PIT) Tags

Earl Prentice (NMFS) provided an update on ongoing studies designed to test the technical and biological feasibility of using PIT tags to identify salmonids. BPA is funding the preliminary studies to determine tag placement, retention, and tissue response to the tag.

PIT tags consist essentially of an antenna coupled to a preprogrammed 40-bit computer chip. The electronics are placed in a polypropylene tube measuring 10 mm long by 2.1 mm diameter (slightly larger than a grain of rice). The tag is capable of receiving and transmitting a 40-50 kilohertz radio signal. Each tag can be uniquely coded with one of about 34 billion codes. Decoding can be done in vivo using a remote sensing device several inches from the fish. The fish does not need to be restrained nor anesthetized during the decoding process which is virtually instantaneous. The cost per tag is presently $5.00 for experimental purposes. Costs may change in the future.

Tagging has been successful at 450 fish/lb. However, 100 fish/lb is the preferred size. Preliminary testing on juvenile chinook and coho (126-212 mm length) and jack chinook indicate that the body cavity is a highly suitable area for tag placement. Both tag retention and survival were found to be in the 97-99% range over a period of 99 days.

Decoding can be done by two methods. The first method uses a hand wand that is held at a distance of 1-3 inches. The second method is to route fish through a pipe or tube that has monitoring loops around it to excite the PIT tags. A 12-inch tube works fine for adults, while juveniles have been monitored successfully in 6 inch by 12 inch tubes. The velocity of the fish can be up to 10 ft/sec., with 95% successful readings and 100% accuracy obtained in test results.

Future plans call for a series of tests to evaluate disease transmission since a single needle is used to inject the tags. In addition, a series of tests will be run to examine if there are any behavioral changes. A third emphasis will be to test the monitoring system at the dams.

C. Update on Smith-Root, Inc.

David Smith (S-R) noted that his firm had spent considerable effort redesigning and modifying their tagging hardware. The tagging machine now has solid state electronics, automatic load/unload, an improved cutting bar, and the ability to handle different diameters of wire. Tag detectors (open face and tube) also have been redesigned to improve sensitivity in all planes.

The color coded tags have also been improved. One change has been to sandblast the wire before applying the epoxy paints, thus greatly improving paint adherence over the old system. A second change is that the surface of the tags will be coated with a background paint

(light colors) that could be assigned to a specific geographic region. A total of 4 color strips, 10 possible colors, and 6 background colors will be used, for a total of approximately 6,000 codes.

Smith also announced that Smith-Root is in negotiations with Identification Devices to become the dealer for the PIT tags. He noted, however, that preliminary discussions with the manufacturer indicated that the price for PIT tags may be substantially greater than the $5/tag now charged NMFS for carrying out feasibility research.

XI. Update on 1984 High Seas Sampling Program

Frank Thrower (NMFS-AK) reviewed the NMFS directed high seas sampling effort for coded wire tagged salmon in the catches of the various foreign commercial and research vessels operating in the North Pacific Ocean and Bering Sea during 1984.

A. Soviet Hake Fisheries

Sixty-four tags were recovered in the Oregon-Washington area directed Soviet hake fisheries. None of these recoveries represented range extensions. This fishery will be declining next year as the Soviet fleet will be moving into the Bering Sea and Gulf of Alaska. As a result, more tags are expected to be recovered there (Bering Sea and Gulf of Alaska).

B. Japanese Mothership Salmon Fishery

U.S. observers on board Japanese salmon motherships (in the area 175°E longitude and to the west) sampled 5,400 chinook for missing adipose clips. Only one was found but it did not have a CWT.

For the first time since the inception of the observer program in 1978, catcher boats were requested to return steelhead to the motherships for sampling. Approximately 500 steelhead were observed. Of these, 7 had an adipose clip and a CWT. One tag was the first high sea recovery from SE Alaska and represented a range extension to 173°E longitude. Four tags were from British Columbia, one of which was also a range extension for British Columbia steelhead stocks. Two tags were from the Columbia River.

C. Japanese Research Vessels

Japanese research vessels operated in the Gulf of Alaska and the western mothership area. Two Columbia River steelhead tags were recovered in the mothership area. In addition, three Washington steelhead tags and seven British Columbia steelhead tags were recovered along the 155°W longitude transect that extended from Kodiak Island south to 36°N latitude.

D. Bering Sea

Trawling has increased for pollock in the Bering Sea, and resulted in the recovery of five chinook tags in the general area between the Pribilof Islands and Unimak Island. Of these, two tags were from SE Alaska and demonstrate that SE Alaska stocks are moving into the Bering Sea. In addition, one tag was from British Columbia and two were from Oregon. These latter three codes represented northwestern range extensions. In addition, one chum salmon from Washington state was recovered in the Bering Sea, which is also a range extension.

E. Pollock Joint Venture Fishery

One hundred thirty-nine tags, all from chinook, were recovered in the pollock J/V fishery in the Gulf of Alaska off Kodiak Island. This represented a great increase in the number of tags recovered over previous years. Approximately 42% were from British Columbia, 36% were from Oregon and Washington, and 20% were Alaskan. One tag was from the Sacramento River in California and represented a northwestern range extension.

A summary report of these data may be obtained from Frank Thrower.

XII. Reporting Ad-Only Steelhead Marks

The question was raised whether or not the proposed use of the recently desequestered Ad clip for steelhead needs to be reported to the Mark Committee for review prior to actual fin marking. The answer was yes. While the marks are in fact already approved for application, it serves a valuable service in coordinating the marking activities of neighboring agencies.

It was also requested that the Ad-only marks continue to be reported in the Mark List. However, it was suggested that perhaps some thought should be given to deleting from the report (but not from the computer files) those broods no longer alive.

XIII. Fin Mark Allocations for 1985

A list of fin mark requests was distributed to the Committee for review. All requested fin marks were approved.

1985 Mark Meeting Attendance

Erik Barth	Yakima Indian Nation
Margaret Birch	CDFO - Vancouver, BC
Lee Blankenship	WDF - Olympia
L. B. Boydstun	CDFG - Rancho Cordova
Ralph S. Boomer	USFWS - Olympia
Robert L. Burkle	Oregon Aqua Foods - Newport
Karen Crandall	ADFG - Juneau
Frank de Libero	WDF/PMFC - Olympia
Jim DeShazo	WDG - Olympia
Rodney Duke	IDFG - Lewiston
Steve Hays	Chelan County PUD - Wenatchee
Andrew Hickenson	CEDC Fisheries - Astoria
Dennis L. Isaac	ODFW - Clackamas
Keith Jefferts	NMT - Shaw Island
Alvin Jensen	NMFS - Pasco
Ken Johnson	PMFC - Portland
Jim Martin	ODFW - Portland
Mike Matylevich	CRITFC - Portland
Scott McCutcheon	NMFS - Pasco
Bill McNeil	Oregon Aqua Foods - Salem
John Meyer	USFWS - Olympia
Jim Norton	ODFW - Clackamas
Dick O'Connor	WDF - Olympia
Steven K. Olhausen	USFWS - Vancouver, WA
Earl Prentice	NMFS - Seattle
Kit Rawson	ADFG - Anchorage
Dan Romey	MIC - Metlakatla
Lin Roberts	ODFW - Portland
Karen Shaw	ODFW - Portland
David Smith	Smith-Root, Inc. - Vancouver, WA
Art Tautz	BCFW - Vancouver, BC
Frank Thrower	NMFS - Auke Bay
Robert Vreeland	NMFS - Portland
Roy Wahle	PMFC - Portland
Terry Wright	NWIFC - Olympia

Attachment 2
(Agenda Item 2)

DEPARTMENT FISH AND WILDLIFE

MEMORANDUM

DATE: February 26, 1985

TO: Commissioners

FROM: Jack Donaldson Jack

SUBJECT: Further Analysis - OCZMA Finclipping Proposal

The purpose of this memo is to describe the analyses you requested from Jim Martin and to comment on the time frame to complete the job.

Analyses Requested:

1. How many coho smolts could be reared by using the $1.3 million cost of first year finmarking for production of hatchery coho instead?

2. How much money was generated by coastal area punchcard and daily angler licenses in 1984? As a % of total?

3. What are the feelings of other relevant agencies (California Fish and Game, Washington Department of Fisheries, U.S Fish and Wildlife Service) on the finclipping proposal? How likely is total compliance for all hatchery coho from Willapa Bay south?

4. Reexamine the hooking mortality literature for differences based on:

   a) Sport vs. commercial.
   b) Large vs. small fish.
   c) Coho vs. chinook.
   d) Barbless vs. barbed hook.
   e) Hook size.

5. Model the usefulness of the finclipping proposal separately for sport and commercial fisheries (don't lump hooking mortalities).

6. Model the system for a variety of possible hooking mortalities and show the "breaking point" mortality rate, above which the idea makes little sense.

7. Model the system, assuming the loss of private hatcheries.

These requests will take considerable time and expense. Unfortunately, the same people who would do this work for both ODFW and WDF are presently working full time and more to develop 1985 salmon season possibilities for the PFMC process.

I request that we defer these analyses until after the PFMC 1985 seasons process is completed. You therefore would not be making a finclipping decision on April 18 but delaying until adequate analyses were completed sometime this summer.

I recognize that some Oregon legislators have urged us to proceed rapidly on this finclipping issue. However, we have a need to do a thorough job when we get back to these important analyses. For example, it appears that an independent review of hooking mortalities is needed to answer critics like Sam Wright and Jay Rasmussen. This independent review cannot be accomplished prior to April 18.

Thanks for your patience on this issue; we will get back on it as soon as the PFMC process allows.

jmw
cc H. Wagner
J. Martin
PMFC
PFMC
E. Manary (WDF)
D. Evans (NMFS)
W. Steucke (USFWS)
B. Fletcher (CDF&G)

Table 1. Status of CWT recovery data by agency and year, including projection dates, in (), for completion by the Regional Mark Processing Center

Agency	Status	Recovery Report Year 1977	1978	1979	1980	1981	1982	1983	1984
ADFG	Submitted	S	S	S	S	(7/85)	S	(4/85)	(12/85)
	Processed	P	P	P	P	(8/85)	P		
	Distributed	D	D	D	D	(8/85)	D	(7/85)	
WDF	Submitted	S	S	S	S	S	S	(6/85)	(11/85)
	Processed	P	P	P	P	P	P		
	Distributed	D	D	D	D	D	D	(7/85)	
ODFW	Submitted	S	S	S	S	S	S	(6/85)	(6/85)
	Processed	P	P	P	P	P	P		
	Distributed	D	D	D	D	D	D	(7/85)	
CDFG	Submitted	S	S	S	(1/85)	(1/85)	(7/85)	(6/85)	(12/85)
	Processed	P	P	P	(3/85)	(3/85)			
	Distributed	D	D	D	(3/85)	(3/85)	(7/85)	(7/85)	
NMFS (Alaska)	Submitted				S	S	S	(6/85)	(10/85)
	Processed				P	P	P		
	Distributed				D	D	D	(7/85)	
NMFS (Seattle)	Submitted	S	S	S	S	S	(2/85)	(2/85)	No Sampling
	Processed	P	P	P	P	P			
	Distributed	D	D	D	D	D		(7/85)	
NWIFC[1/]	Submitted			S	S	S	S	(5/85)	(5/85)
	Processed			P	P	P	P		
	Distributed			D	D	D	D	(7/85)	
USFWS.	Submitted			S	S	S	S	(6/85)	(10/85)
	Processed			P	P	P	P		
	Distributed			D	D	D	D	(7/85)	
CANADA[2/]	Processed	P	P	P	P	P	P	(6/85)	(10/85)
	Distributed								
	A) CDFO	D	D	D	D	D	D		
	B) PMFC	D	D	D	D	D	D	(7/85)	

[1/] NWIFC assumed responsibility in 1983 for reporting tribal recoveries for years 1979 onward. WDF reported tribal recoveries (primarily Quinault) for 1977 and 1978.

[2/] Canadian recovery data are published by CDFO, and only included in the season summary section of the PMFC reports.

PACIFIC MARINE FISHERIES COMMISSION

305 STATE OFFICE BUILDING
1400 S.W. FIFTH AVENUE
PORTLAND, OREGON 97201
PHONE (503) 229-5840

MEMORANDUM

June 26, 1985

TO: Tag Coordinators

FROM: Ken Johnson, Regional Mark Processing Center

SUBJECT: Returning Tags to Releasing Agencies

Enclosed is an updated listing of addresses (enclosed) that should be used for returning other agencies' tags for verification. While most tag coordinators prefer to have the tags sent directly to them, there are several exceptions. Oregon tags, for example, should be sent directly to the ODFW head lab in Clackamas.

Please check the list with your present mailing procedures to see if changes are needed.

JKJ:mmd

Enclosure

June 25, 1985

ADDRESSES FOR RETURNING RECOVERED TAGS FOR VERIFICATION

Area/Agency	Agency Codes	Individual (+ phone no.)	Mailing Address
Alaska (+ private)	4, 31, 62, HO H4, BO, B4	Karen Crandall (907-465-3483)	Alaska Department of Fish and Game P.O. Box 3-2000 Juneau, AK 99802
British Columbia	2, 8, 12, H2	Margaret Birch (604-666-2796)	Canada Dept. Fisheries & Oceans 1090 W. Pender Street, 5th Floor Vancouver, BC V6E 2P1
Washington (WDF + Private) "Salmon"	1, 11, 13 15, 62, 63 H1	Lee Blankenship (206-754-1995)	Washington Department of Fisheries 115 General Administration Building Olympia, WA 98504
Washington (WDG)	62	Jim DeShazo (206-753-2895)	Washington Department of Game 600 N. Capitol Way Olympia, WA 98504
Washington (NIFC Tribes)	21, B5	Terry Wright (206-352-8030)	Northwest Indian Fisheries Commission 2625 SW Parkmont Lane, Bldg. C Olympia, WA 98502
Oregon	7, 9, 60, 62 HO, H7	Jim Norton (503-657-2020)	Oregon Department of Fish & Wildlife 17330 SE Evelyn Street Clackamas, OR 97015
Idaho	10	Rodney Duke (208-743-6502)	Idaho Department Fish & Game 1540 Warner Avenue Lewiston, ID 83501
California (+ private)	6, H6	Joanne Karlton (916-355-7095)	California Department Fish & Game 1701 Nimbus Road, Suite B Rancho Cordova, CA 95670
NMFS (Alaska)	3, H3	Frank Thrower (907-789-7231)	National Marine Fisheries Service Auke Bay Lab P.O. Box 210155 Auke Bay, AK 99821
NMFS (Wash.-Col. River)	3, 23 + color + rare earth	Scott McCutcheon (509-547-7518)	National Marine Fisheries Service Big Pasco Industrial Park Building 900 Pasco, WA 99301
USFWS (WA-OR-ID-CA)	5, 14, H5 B5	David Zajac (206-753-9460)	U.S. Fish and Wildlife Service 2625 SW Parkmont Lane, Bldg. A Olympia, WA 98502
Alaska (Metlakatla)	47	Dan Romey (907-886-5111)	Metlakatla Indian Community P.O. Box 556 Metlakatla, AK 99926

PACIFIC MARINE FISHERIES COMMISSION

305 STATE OFFICE BUILDING
1400 S.W. FIFTH AVENUE
PORTLAND, OREGON 97201
PHONE (503) 229-5840

MEMORANDUM

TO: Mark Committee

Februrary 16, 1985

FROM: Ken Johnson, Regional Mark Center

SUBJECT: Need for a Regional On-Line CWT Database

I. Introduction

One of the key agenda items for the 1985 Mark Meeting will be a discussion of the Northwest Indian Fisheries Commission's recent proposal regarding the development and implementation of an on-line regional CWT data base management system that would be coordinated by PMFC. The proposal has great merit and embodies general data management concepts that were discussed at length during the 1984 Mark Meeting. Regardless of who eventually coordinates the on-line data base, PMFC is committed to doing all that it can do to support this important effort.

In order that discussion on this subject be productive at the Mark Meeting, a preliminary scoping session was held in Olympia (WDF headquarters) on January 9th to determine what was feasible and to explore possible options for accomplishing the project. Those in attendance were experienced in data processing and understood data needs of management and researchers. The following individuals participated:

Lee Blankenship (WDF)
L.B. Boydstun (CDFG)
Richard Comstock (USFWS)
Will Daspit (PMFC-PacFIN)
Frank de Libero (PMFC/WDF)
Ken Johnson (PMFC)
Louis Lapi (CDFO)
Ken Newman (NWIFC)
Dick O'Connor (WDF)
Lin Roberts (ODFW)
Pete Sheppard (PMFC Consultant)
Bob Vreeland (NMFS)
Terry Wright (NWIFC)

II. Conclusions of Preliminary Meeting

In the interest of brevity, only the principle conclusions will be presented below.

A. Nature of Existing Regional CWT Data Bases

First and foremost, there was complete agreement that an on-line regional CWT data base was necessary and that it consist of the "raw" individual records after the necessary error checks have been done. It also was agreed that the WDF on-line data base at

the University of Washington could not serve in this capacity since it was designed for management needs and included many modified records (i.e aggregated data across area and/or time strata). Similarly, Frank de Libero's on-line regional data base could not then meet the necessary standards of only raw data since some editing had been done for analytical purposes. Both systems thus entail a degree of data reduction and represent applications arising from a "level one" or raw, edited data base.

Louis Lapi (CDFO) noted, however, that British Columbia has likewise invested a considerable effort in the past two years to develop an on-line CWT data retrieval system that is based on raw recovery records and unmodified catch statistics. Much effort has gone into standardizing hatchery names and release sites so that non-Canadian CWT data can be loaded and processed as well. While this system is not complete yet, it will need to be examined carefully as a possible prototype for the regional data base.

B. Possible Role of PMFC

While there was unanimous support for the development of an interactive 'level one' CWT data base, the current effort of PMFC to accomplish this goal was called into question by WDF. The reason given for this was that the present U.S.-Canada salmon treaty stipulates in the Memorandum of Understanding that "...the Parties consider it necessary to develop a coast-wide stock assessment and management data system, including catch, effort, escapement, and coded-wire tag data which will yield reliable management information in a timely manner ...". Thus it was suggested that any PMFC effort would be a duplication of efforts that may result from the U.S.-Canada treaty.

In response, Johnson (PMFC) pointed out that while the U.S.-Canada treaty left things somewhat in limbo, PMFC's primary objective is that the data base be developed, regardless of where it ultimately resides. Therefore, since many of the same individuals will be involved regardless of the avenue of development, it was recommended that PMFC sponsored ad-hoc committee efforts continue. This recommendation was accepted.

C. Design of CWT Data Base

On the basis of extensive experience in designing the Pac-FIN data base, Will Daspit recommended that the next step should be to identify the objectives of the data base. Once the data retrieval capabilities have been defined, a system analyst should be contracted to design the necessary system to meet those needs. This recommendation was accepted without dissent and much of the remainder of the meeting was spent in identifying products needed from a CWT data base (See Section II.D below).

L.B. Boydstun (CDFG), however, raised an important issue with respect to timeliness of the present data. He noted that while the development of an on-line system is essential, it will require a signficant amount of time to do so. Yet agencies continue to have problems obtaining even preliminary recovery

data that would be a tremendous help for the Salmon Team. He therefore urged that until an on-line system is functional, preliminary recovery data be forwarded to the Regional Mark Processing Center so that it could be put into standard report form. If this was done, it would greatly simplying the task of salmon managers who require the data for decision making. Johnson (PMFC) noted that he was more than willing to process preliminary data and would only distribute it on computer paper to insure that it would not be viewed as a final report.

There appeared to be substantial support for California's proposal. It was agreed also that the matter would be brought before the Mark Committee as part of the deliberations on the regional CWT data base.

D. Identification of Data Retrieval Needs

The following retrieval capabilities were specified as necessary for a regional interactive CWT data base. Please review them carefully as there are likely others that are basic and should be added to provide the necessary "building blocks" to generate the variety of reports and analytical capabilities.

1) All recoveries of tag codes coastwide (= raw file)

   - Complete record for each recovery to include all data items for statistical analysis

2) All recoveries within given area, fishery, etc

   - Recovery aspect emphasized

3) All recoveries of tag code by hatchery and area

4) Catch/sample data (raw); plus awareness factors

5) Release data base for all tag codes

   - Current data available in CWT Release Report
   - Rearing/release history
   - Nature of study
   - Representative of what group of fish
   - Evaluation of study's success in meeting objectives

6) Resolution of release/recovery data; allowing for selection by multiple criteria (code,area,time,etc)

7) Standardization of areas and other items, including

   - Gear Codes
   - Hatchery names
   - Release Sites
   - Stocks
   - Methods used to handle data discrepancies prior to reporting
   - Definitions used for sample types

8) Expandable for future needs

9) Audit trail for updating individual records

10) Annual update of entire file

11) Possible revision of current publication methods, including publication report history

12) Commence with current year and work back

III. Possible Solutions to CWT Data Base

There are a number of ways by which a regional CWT data base could be established in a relatively short time. Several of these are briefly outlined below. Some advantages and disadvantages also are included where known. While much additional work is needed to identify the best solution, this information should be adequate as a spring board for discussion at the Mark Meeting.

A. Use Existing PMFC Database System

There are several advantages to taking this approach:

1) The data base and software are already in place for providing for many of the data needs identified above. Only minimal programming (2-3 months at most) would be required to accommodate entire expanded data base.

2) The existing operating system is an interactive relational database management system (PICK), and includes among other features,

- Variable length fields, records, and files
- Powerful inquiry verbs simplifying data entry and retrieval, and minimizing programming

3) The additional hardware and software costs needed to make this database available regionally would be minimal.

4) Once such a system is in place, reporting functions that are currently being performed on a batch-publication basis could be performed on an as-needed basis by external users. This would reduce PMFC publication costs and give agencies access to the most current version of the data.

What Would Be Needed?

To expand the current system into a regional database, the following would have to be purchased:

1) Additional disk space to accommodate the full data set.

2) A more powerful processor to handle the additional users without serious degradation in response time.

3) Communication equipment - modems, phone lines, and remote terminals and printers.

4) A friendly user interface to guide the naive user in selecting and listing subsets of the raw data.

5) Computer-to-computer communications software for the direct transfer of large data sets.

6) Estimated cost for a "super-minicomputer" (e.g. Ultimate) is $180,000 plus an additional $20,000 for printers, modems, etc. Annual maintenance costs would be $15-20,000.

Probably the only serious disadvantage is that the PICK operating system has been designed for business and does not have the extensive statistical packages such as SPSS. However, software does exist that allows PICK systems to communicate with VAX's, etc. Thus data could be downloaded if necessary.

B. SIR/DBMS - University of Washington

Another option would be to load all raw CWT data onto the data base management system (DBMS) currently used by Frank de Libero. This has been largely accomplished since the January 9th meeting and is proving very successful. There are many advantages to using SIR/DBMS:

1) The system is designed for huge data bases

2) Costs of retrieval are proving to be quite reasonable

3) Complete statistical packages are available

4) Complete input/output facilities exist for sending data both ways

5) SIR/DBMS is available in many sites, affording the option for downloading subsets of data

6) Communication networking (TELENET) and necessary hardware are already available

7) de Libero's work on the system has shown that it is fast, efficient, and capable of producing CWT brood year reports, etc.

There are also some disadvantages that must be considered. Among them are:

1) SIR/DBMS is not user friendly and probably would require programming to develop a 'menu system' for user interfacing.

2) At the present time, the CWT data base on SIR is designed to provide information from the hatchery viewpoint. Additional programming will be required to also allow queries from the fishery or recovery area viewpoint.

3) Compute resources will be shared with a host of other programs; however the system is continually upgraded by the Univ. Of Washington.

4) Cost of data retrieval, storage, and maintenance may be substantially greater than if the computer is owned "in-house".

C. VAX system (Canada Dept. Fish. & Oceans)

A third option would be to use the present system being developed by CDFO. I am unfamiliar with the system other than it is designed to use release codes to access recovery data files or the area of catch to access the release files. In addition, it is composed of raw edited data and thus could meet the requirements of a regional on-line data base.

Possible disadvantages are that the system has been designed to meet British Columbia's management and research needs. Thus, design modifications likely would be required to serve as a regional data base. Cost and ease of access will be discussed at the Mark Meeting.

D. Other?

Several other options exist, none of which have been explored in any depth. One would be for PMFC or another agency to purchase a computer and limit its use to the CWT data base. Another possibility might be to load the data on the NMFS's Burroughs computer in Seattle since Pac-FIN data already reside there. If this is done, however, a substantial investment in programming likely would be required.

1. SIR/DBMS – create data sets for distribution to all agencies on a central system (Unix or other). each agency could then set up SIR DBMS on their system or could opt to access PMFC data direct

To : Terry 2/19/85
From : Ken

Topic: Remarks on Ken Johnson's 2/16/85 letter

I have no disagreements with his summary of what happened at the last meeting, although the items listed under II D are somewhat disorganized (but that's the way the meeting went). I do have some suggestions and recommendations for future action, however.

1. With regard to Boydstun's timeliness question on page 2- why not simply keep two sets of data files for the data base once established, with identical formats? Let one set be "hard, finalized" data, and the other be "soft, preliminary" data, with the latter file presumably being the larger file.

2. I think it's easier to view the possible <u>structure</u> of the <u>data files</u> as follows:

a. Records or Cases- all recoveries, coastwide, of all species of tagged fish from 1971 (or whenever) on

b. 2 Major Groups of Variables or Fields- Recovery and Release information

<u>Release Variables</u>	<u>Recovery Variables</u>
items listed on p3 no. 5	time, area, fishery, gear
	catch and sample
	dummy and/or awareness vars.
	production factor??

3. And the <u>necessary features</u>:

a. Standard and unique time, area, fishery, hatchery,...codes.
b. Internal documentation noting time of last update, assumptions, etc.
c. A time and area resolution for both of the above 2 groups of variables that satisfies researchers and managers. This is still a big unanswered question.

4. My recommendation is to go with SIR, for the following reasons:
a. It's already established, therefore, PMFC does not have to hire a programmer to develop a custom-made package.
b. It's transportable to a lot of different kinds of mainframes.
c. It can produce BMDP and SPSS "Save" Files as output.
d. On the basis of Frank's work- it seems relatively cheap and

Recovery Queriables

time, area, fishery, gear
catch and sample
survey and/or emergency work
production tonnage?

Table 1. Status of CWT recovery data by agency and year, including projection dates, in (), for completion by the Regional Mark Processing Center

Agency	Status	Recovery Report Year 1977	1978	1979	1980	1981	1982	1983	1984
ADFG	Submitted	S	S	S	S	(7/85)	S	(4/85)	(12/85)
	Processed	P	P	P	P	(8/85)	P		
	Distributed	D	D	D	D	(8/85)	D	(7/85)	
WDF	Submitted	S	S	S	S	S	S	(6/85)	(11/85)
	Processed	P	P	P	P	P	P		
	Distributed	D	D	D	D	D	D	(7/85)	
ODFW	Submitted	S	S	S	S	S	S	(6/85)	(6/85)
	Processed	P	P	P	P	P	P		
	Distributed	D	D	D	D	D	D	(7/85)	
CDFG	Submitted	S	S	S	(1/85)	(1/85)	(7/85)	(6/85)	(12/85)
	Processed	P	P	P	(3/85)	(3/85)			
	Distributed	D	D	D	(3/85)	(3/85)	(7/85)	(7/85)	
NMFS (Alaska)	Submitted				S	S	S	(6/85)	(10/85)
	Processed				P	P	P		
	Distributed				D	D	D	(7/85)	
NMFS (Seattle)	Submitted	S	S	S	S	S	(2/85)	(2/85)	No Sampling
	Processed	P	P	P	P	P			
	Distributed	D	D	D	D	D		(7/85)	
NWIFC[1/]	Submitted			S	S	S	S	(5/85)	(5/85)
	Processed			P	P	P	P		
	Distributed			D	D	D	D	(7/85)	
USFWS	Submitted			S	S	S	S	(6/85)	(10/85)
	Processed			P	P	P	P		
	Distributed			D	D	D	D	(7/85)	
CANADA[2/]	Processed	P	P	P	P	P	P	(6/85)	(10/85)
	Distributed								
	A) CDFO	D	D	D	D	D	D		
	B) PMFC	D	D	D	D	D	D	(7/85)	

1/ NWIFC assumed responsibility in 1983 for reporting tribal recoveries for years 1979 onward. WDF reported tribal recoveries (primarily Quinault) for 1977 and 1978.

2/ Canadian recovery data are published by CDFO, and only included in the season summary section of the PMFC reports.

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PACIFIC MARINE FISHERIES COMMISSION

305 STATE OFFICE BUILDING
1400 S.W. FIFTH AVENUE
PORTLAND, OREGON 97201
PHONE (503) 229-5840

EXECUTIVE DIRECT
LAWRENCE D
TREASURER
G. L. FISHER

February 12, 1985

Mr. Sam Wright
Divisional Administrator
Fisheries Management Division
Washington Department of Game
600 North Capitol Way, GJ-11
Olympia, WA 98504-0091

Dear Sam:

I am sorry for the delay in responding to your letter of December 28, 1984 concerning the coho adipose clip proposal; we didn't receive it until January 14 and I have been out of the office since then.

You raise serious questions about some of the assumptions and conclusions in the technical team's report. I am not in a position to respond for the technicians involved, nor do I have the expertise to do so. Since you and they are considered to be experts in the area, I can only conclude that there is a significant range of views with regard to what is fact, especially concerning hooking mortality in the ocean sport fishery.

You suggest that hooking mortality in the sport fishery is about 5%. Others believe it could be as high as 45% or higher. The majority, I believe, feel that it is somewhere in between those two estimates, say 30%. From a decision-makers point of view, this wide range of estimates is disconcerting.

We obviously do not have a very good handle on hooking mortality for the sport fishery. If the results of the analysis are particularly sensitive to the estimate of hooking mortality, then this becomes a serious concern. I will suggest that the analysis include a broader range of estimates, including the 5% value. This begs the question of what the true value is. I think it would be appropriate for an independent expert to review the existing literature and data on hooking mortality. The result of this analysis may confirm a best estimate, or it may suggest that specific research be conducted. In the latter case, the agencies could try to find some funds to do the work.

With regard to your last point, as far as I am concerned, this issue is not a "dead horse". Decision-makers, like the Oregon Fish and Wildlife Commission, have yet to consider public testimony and make a decision. They will decide if this is a "dead horse" or not. As far as I know, this proposal or some variation of it, is still a viable option.

Thank you for taking the time to send your views on this matter.

Sincerely,

J. Kenneth Johnson
for

Lawrence D. Six
Executive Director

LDS:mmd

cc: Executive Committee
Joe Greenley
Jay Rasmussen
Harry Wagner
Ed Manary

Northwest Marine Technology, Inc.
Shaw Island, Washington 98286 · 206/468-2340 · Telex 287944 NWMT UR

9 January 1985

Dr. Ken Johnson
Pacific Marine Fisheries Commission
528 S.W. Mill Street
Portland, OR 97201

Dear Ken,

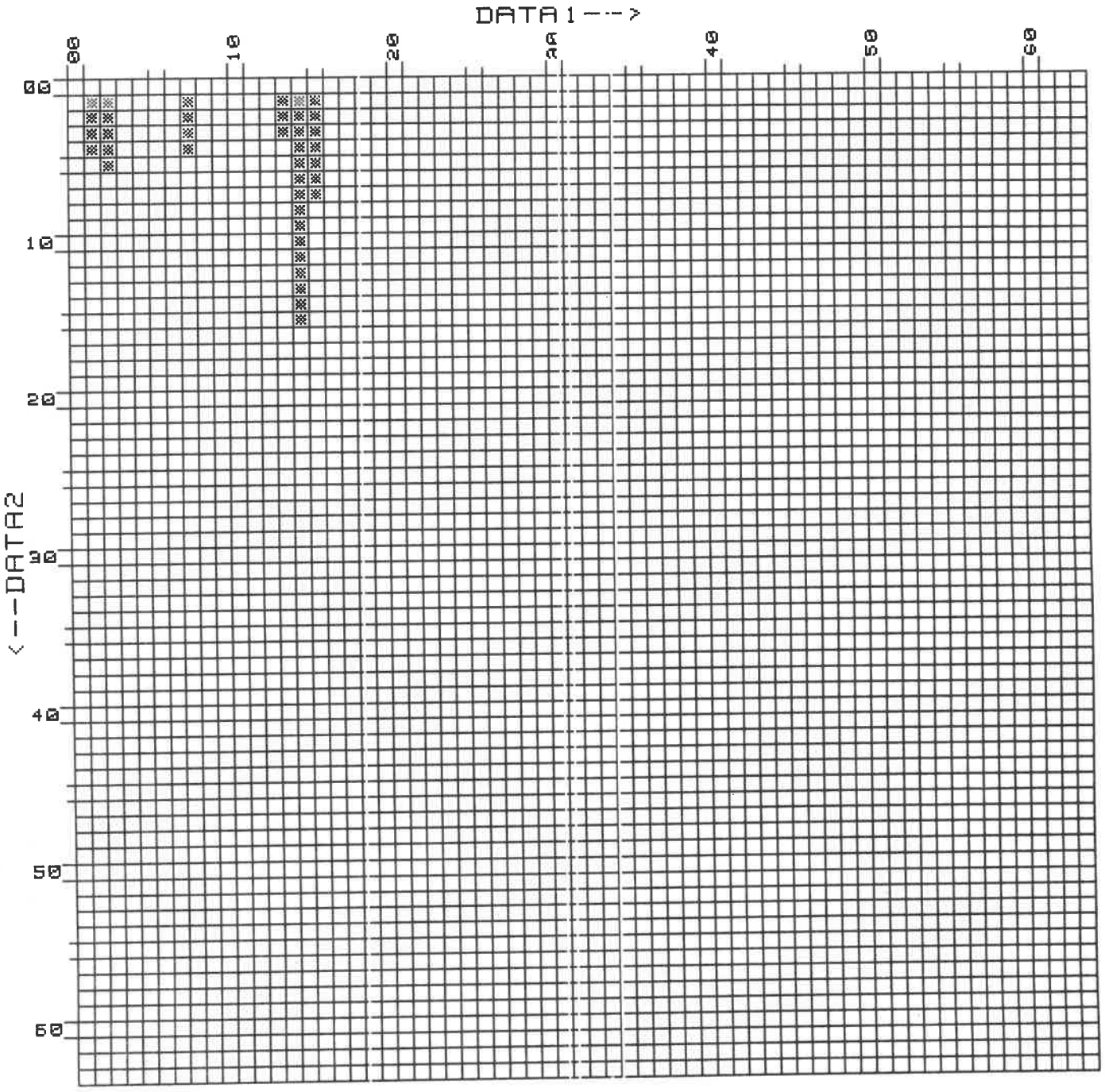
Enclosed please find a new set of computer generated tag code assignment sheets for the Northeastern Pacific generated January 7, 1985. The list of code assignments shows all codes issued to the designated agencies through this date.

If I can be of any further assistance please call.

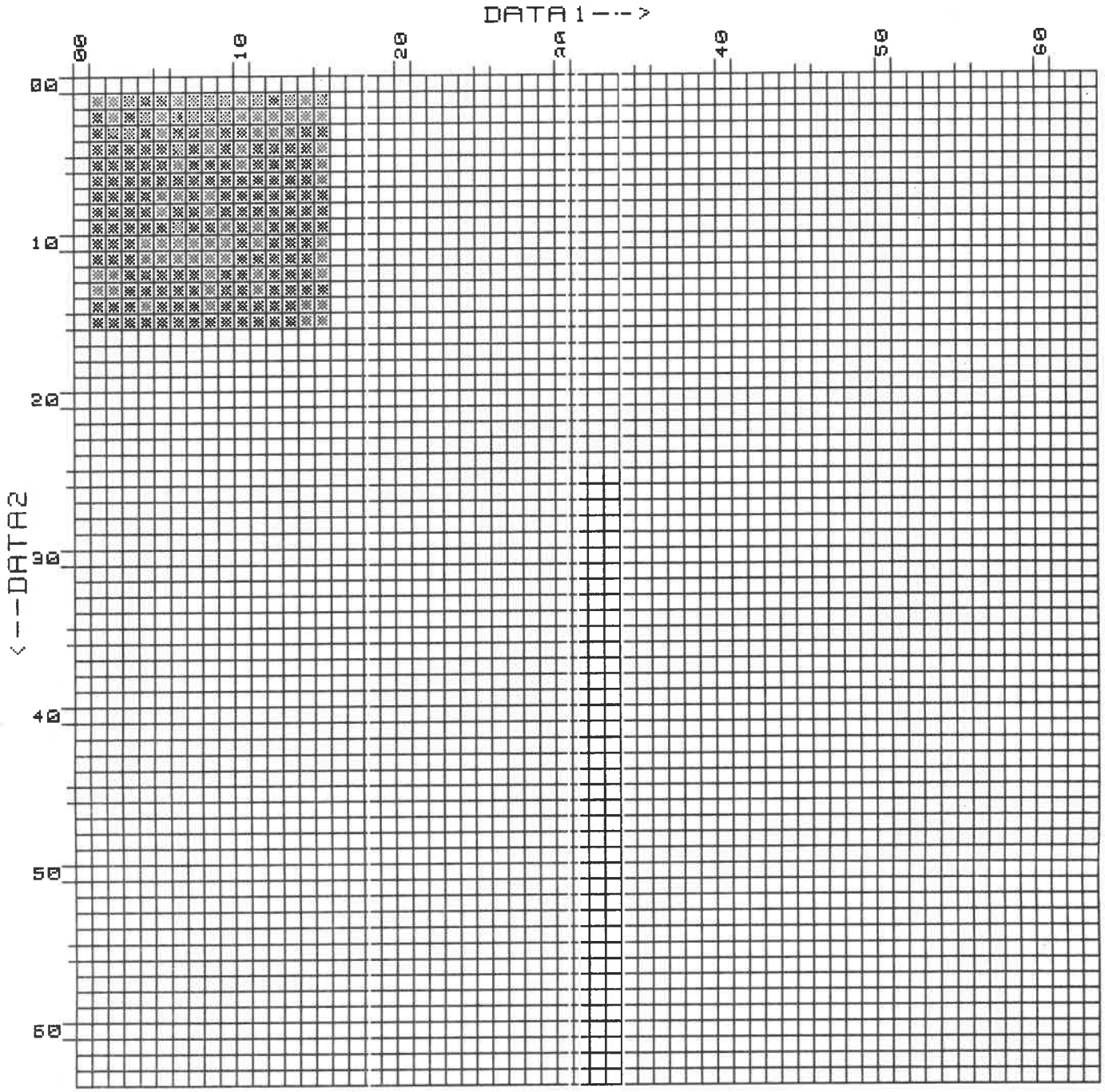
Sincerely,

R. D. Fralick, Ph.D.
Director of Research

Enclosures: Tag Charts



Agency 00 MISCELLANEOUS
1/7/85



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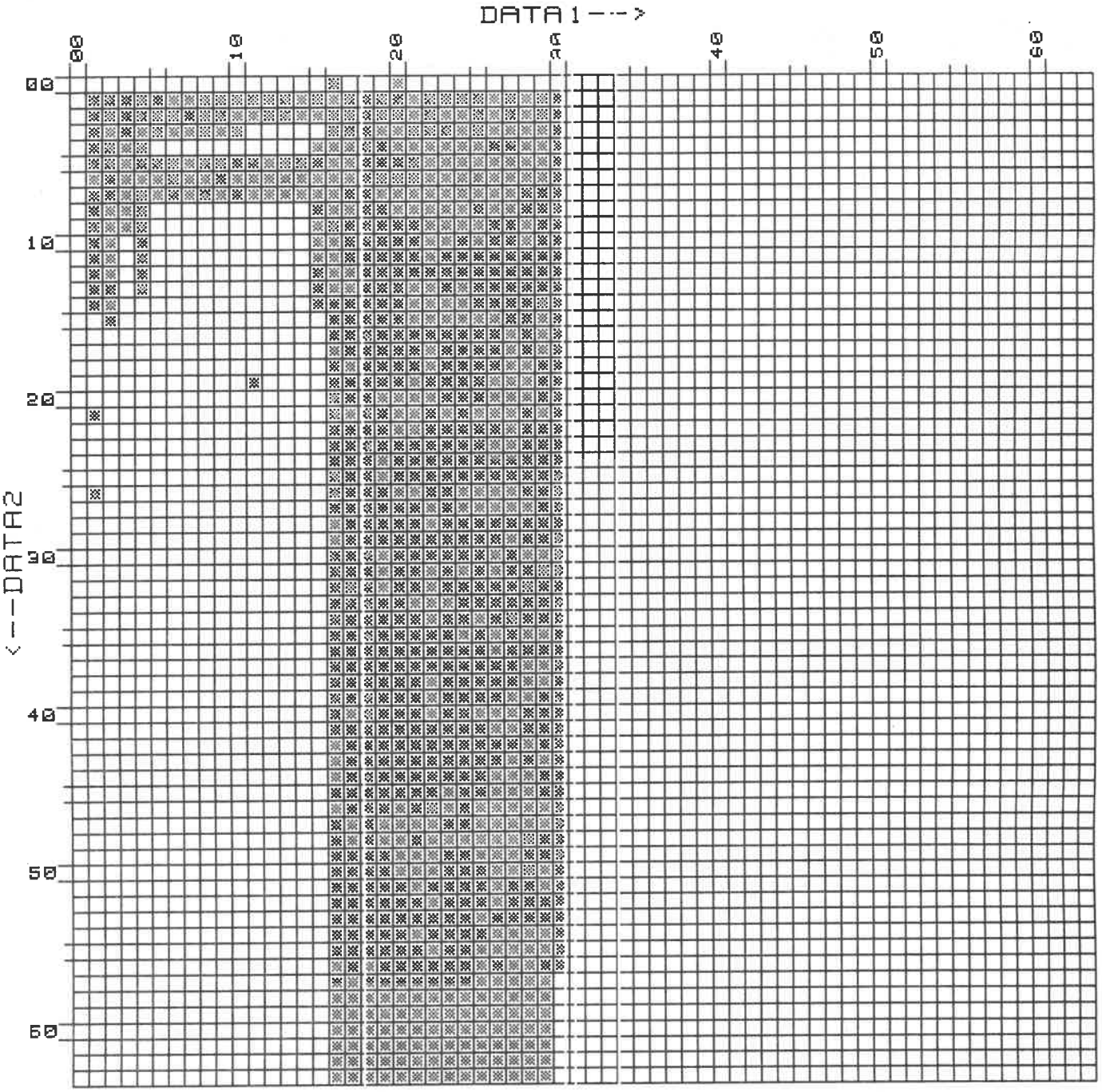
1/7/85



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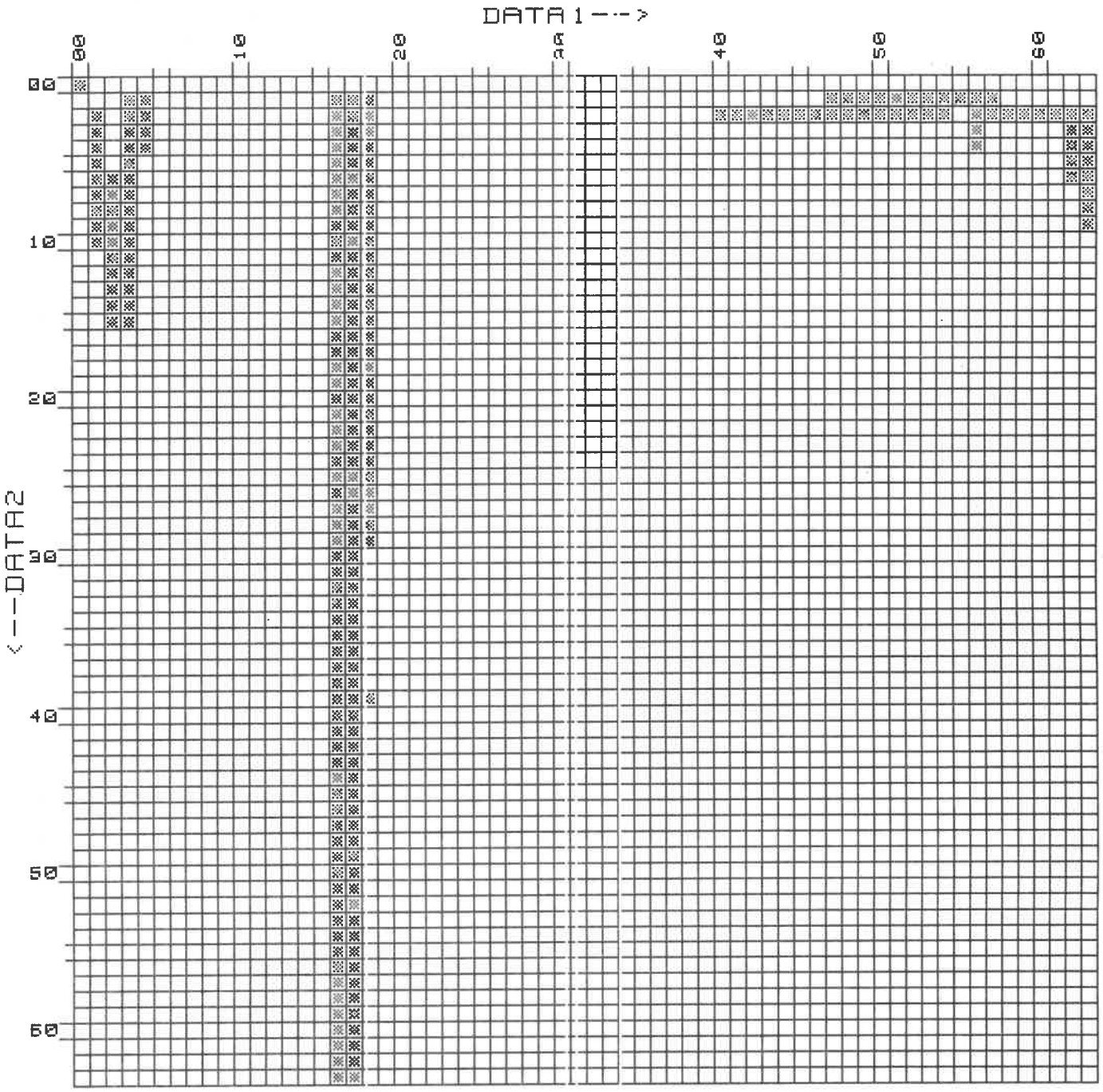

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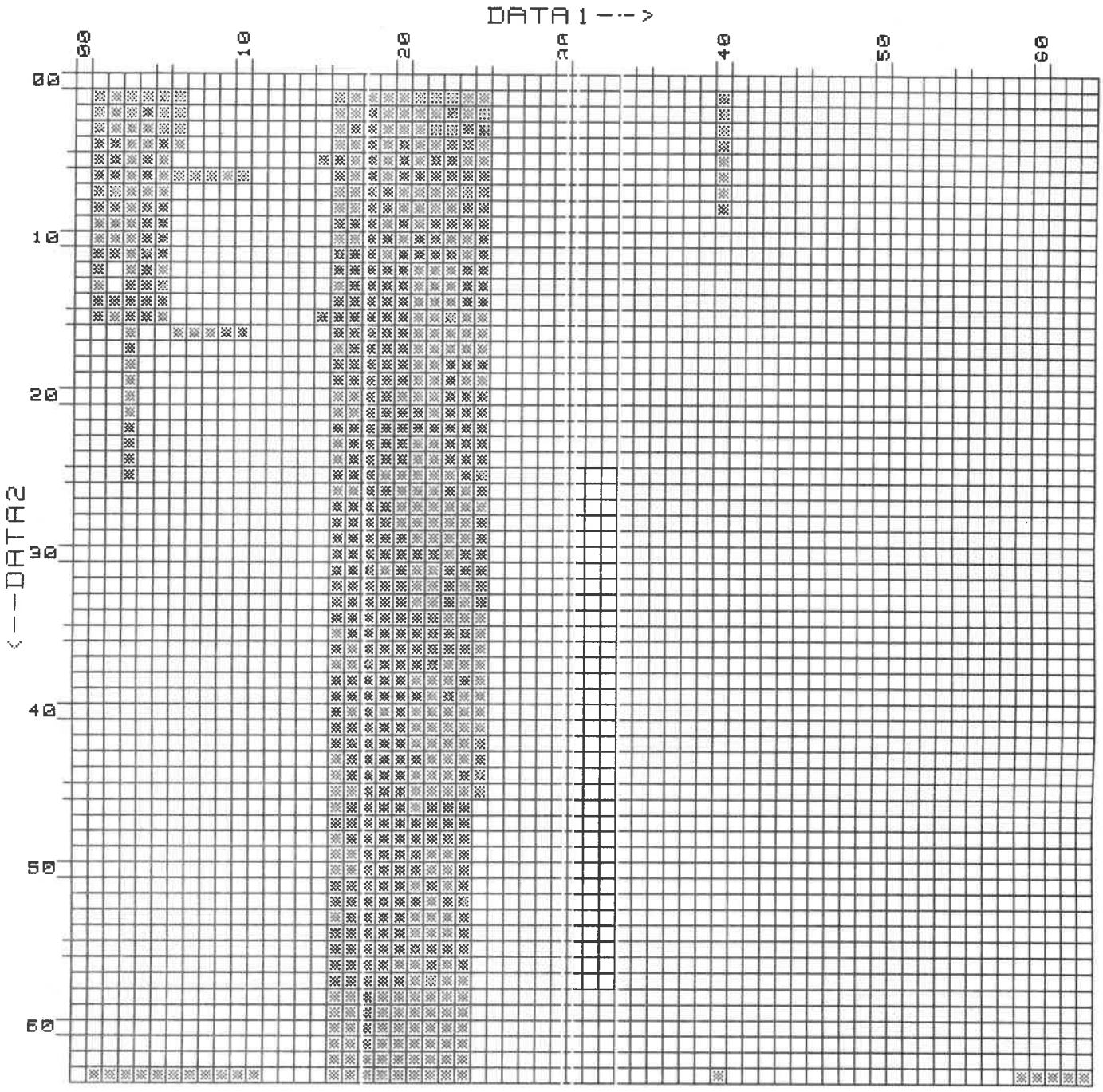
1/7/85



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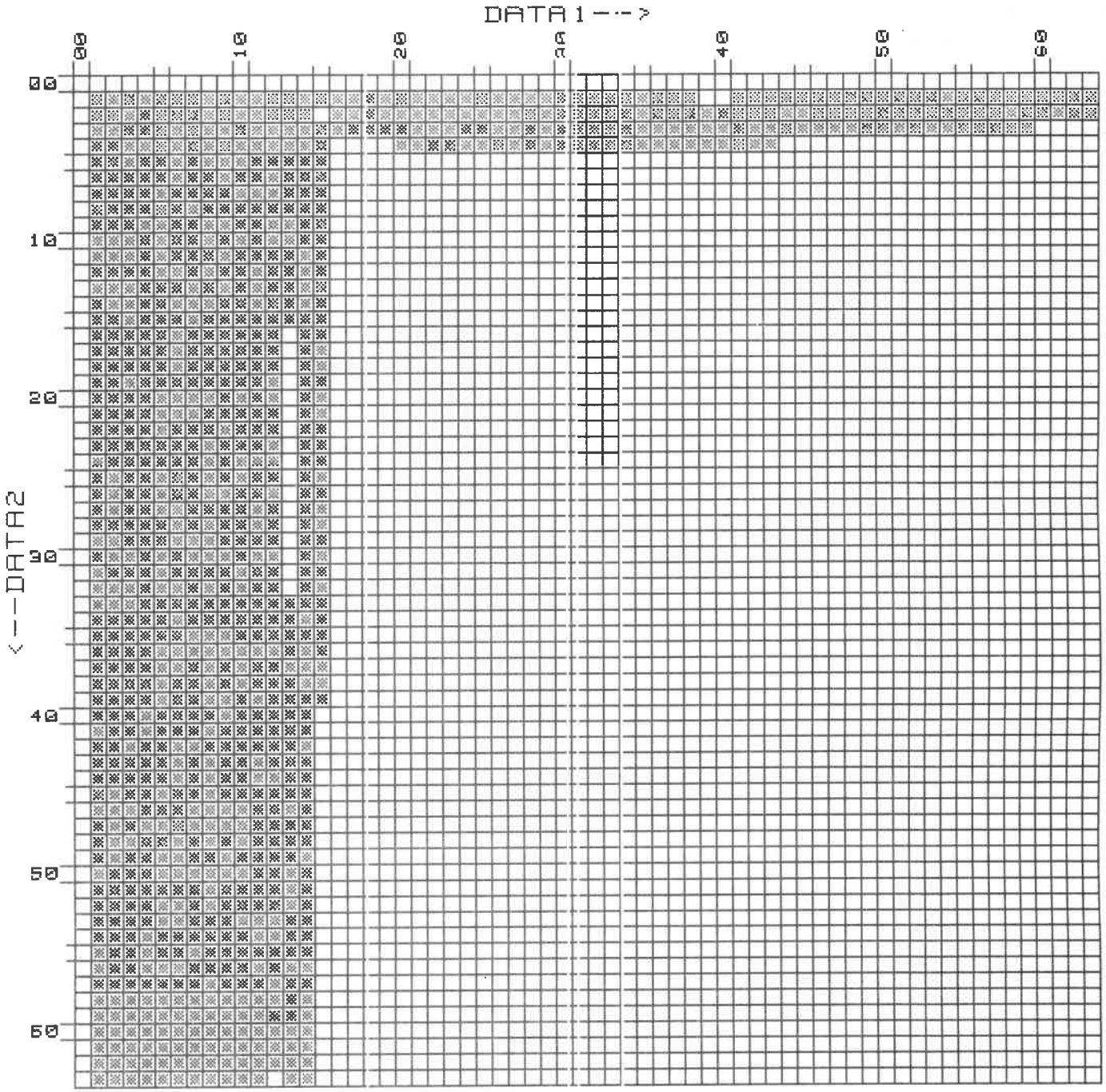
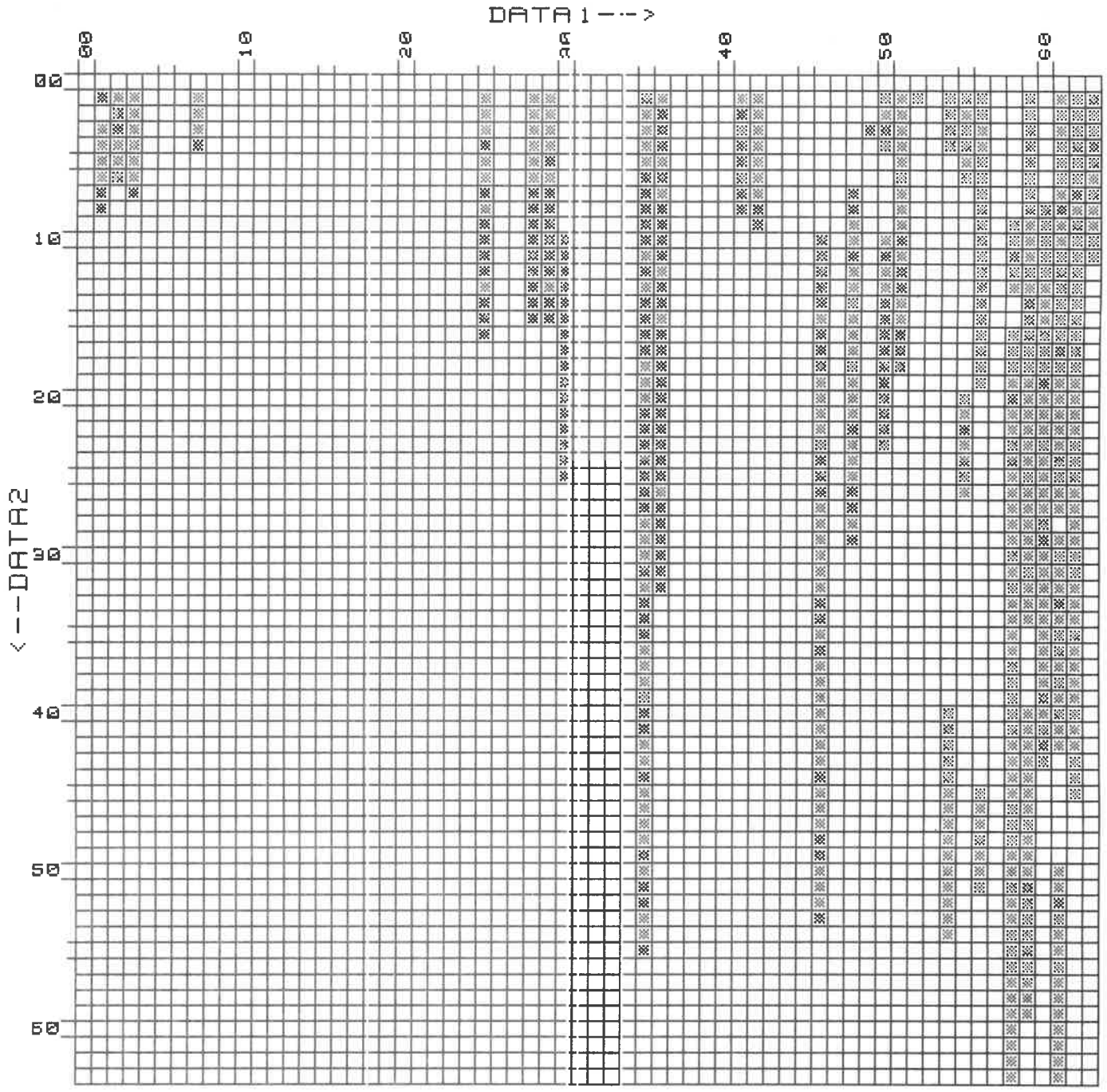
1/7/85



Agency 05 US FISH & WILDLIFE SERVICE
1/7/85



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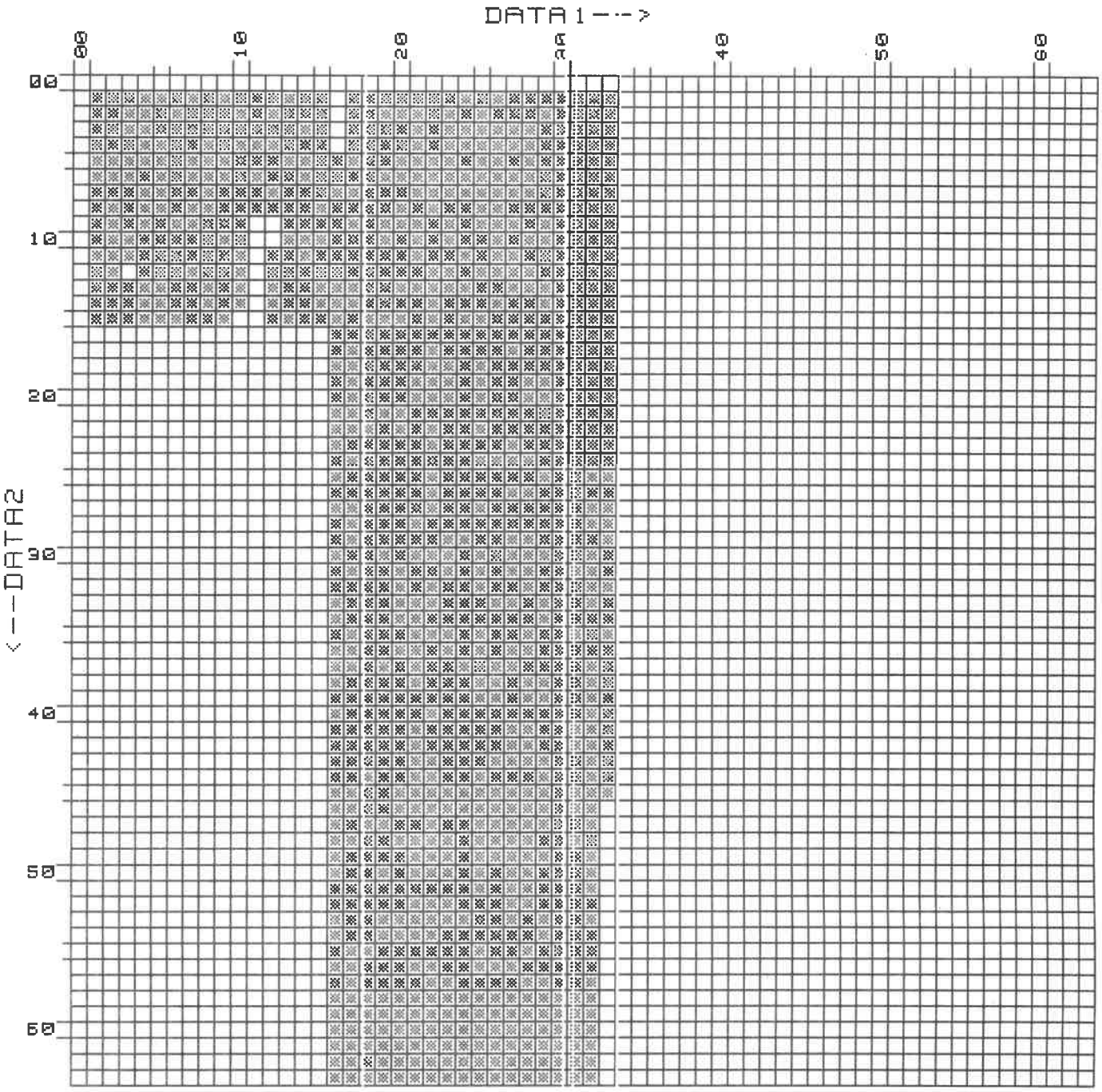

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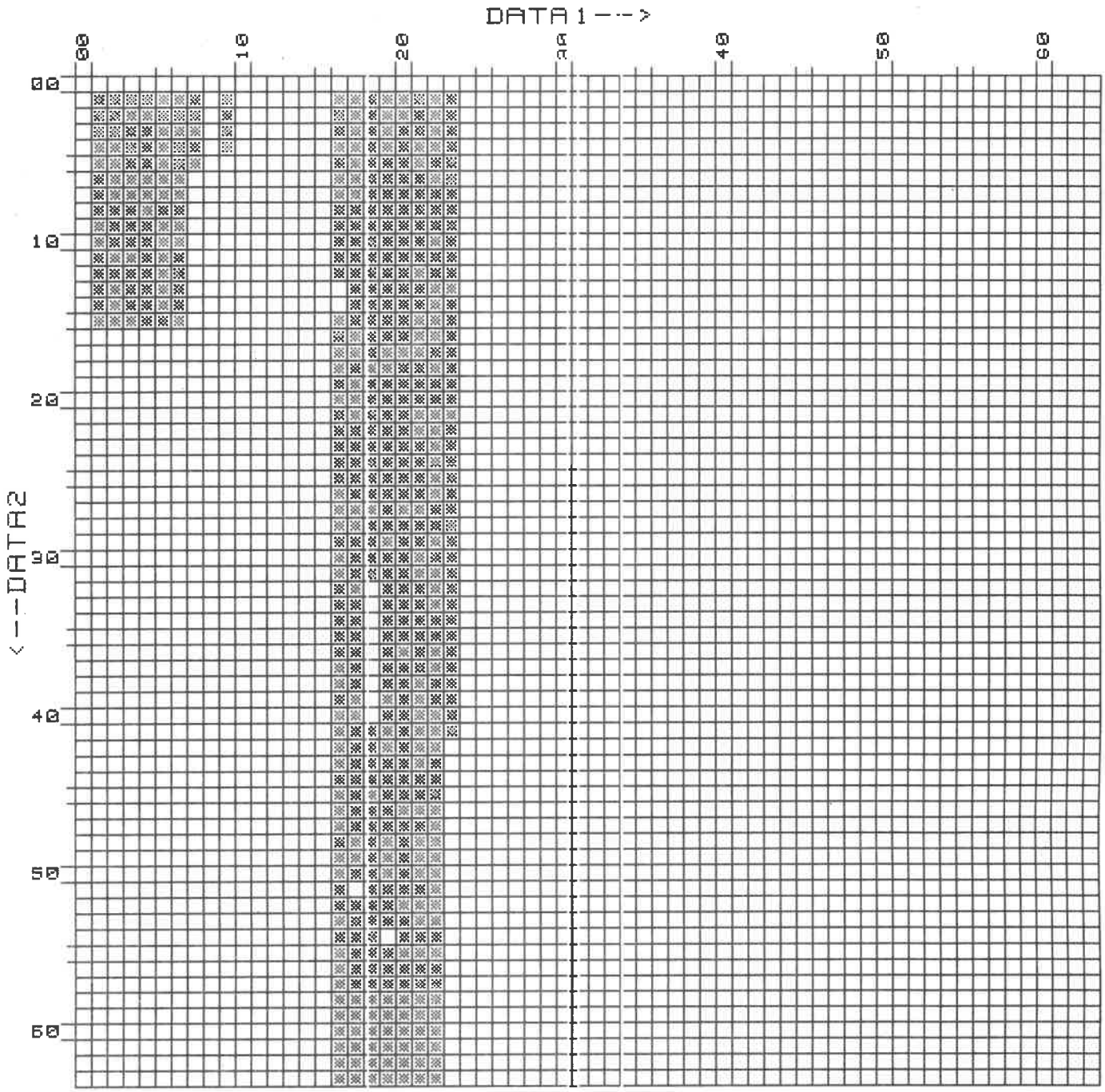

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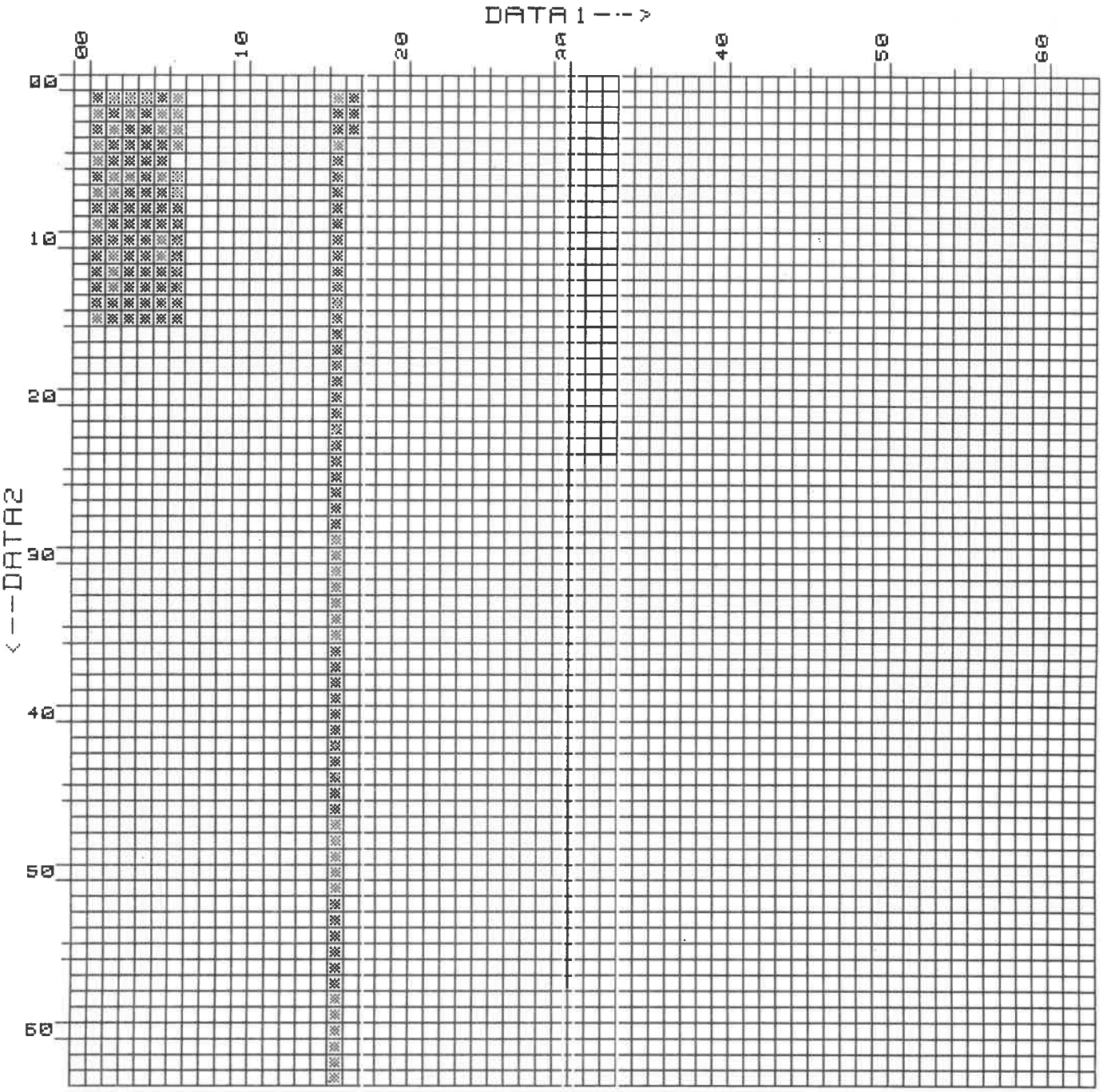
1/7/85



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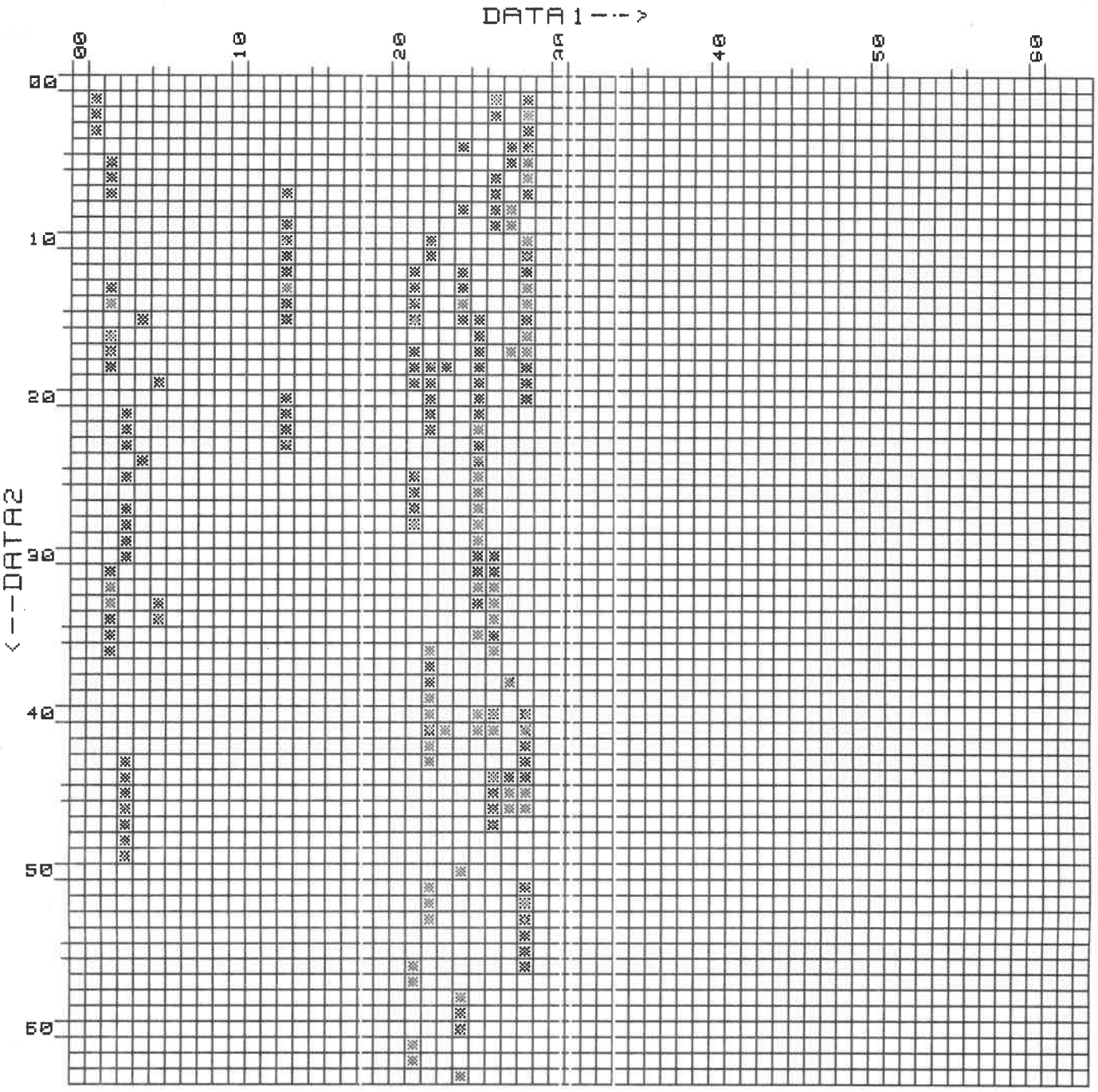

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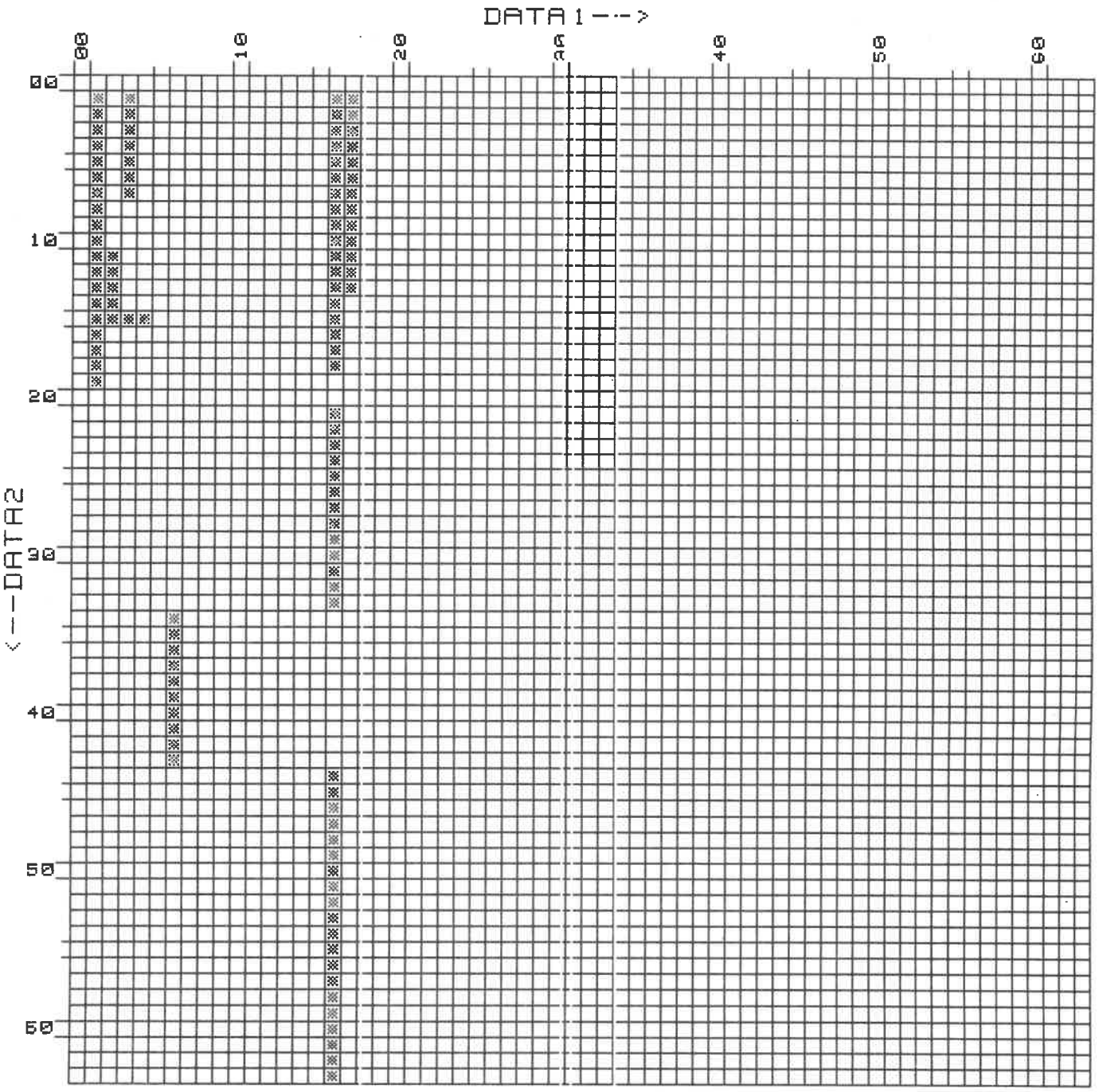
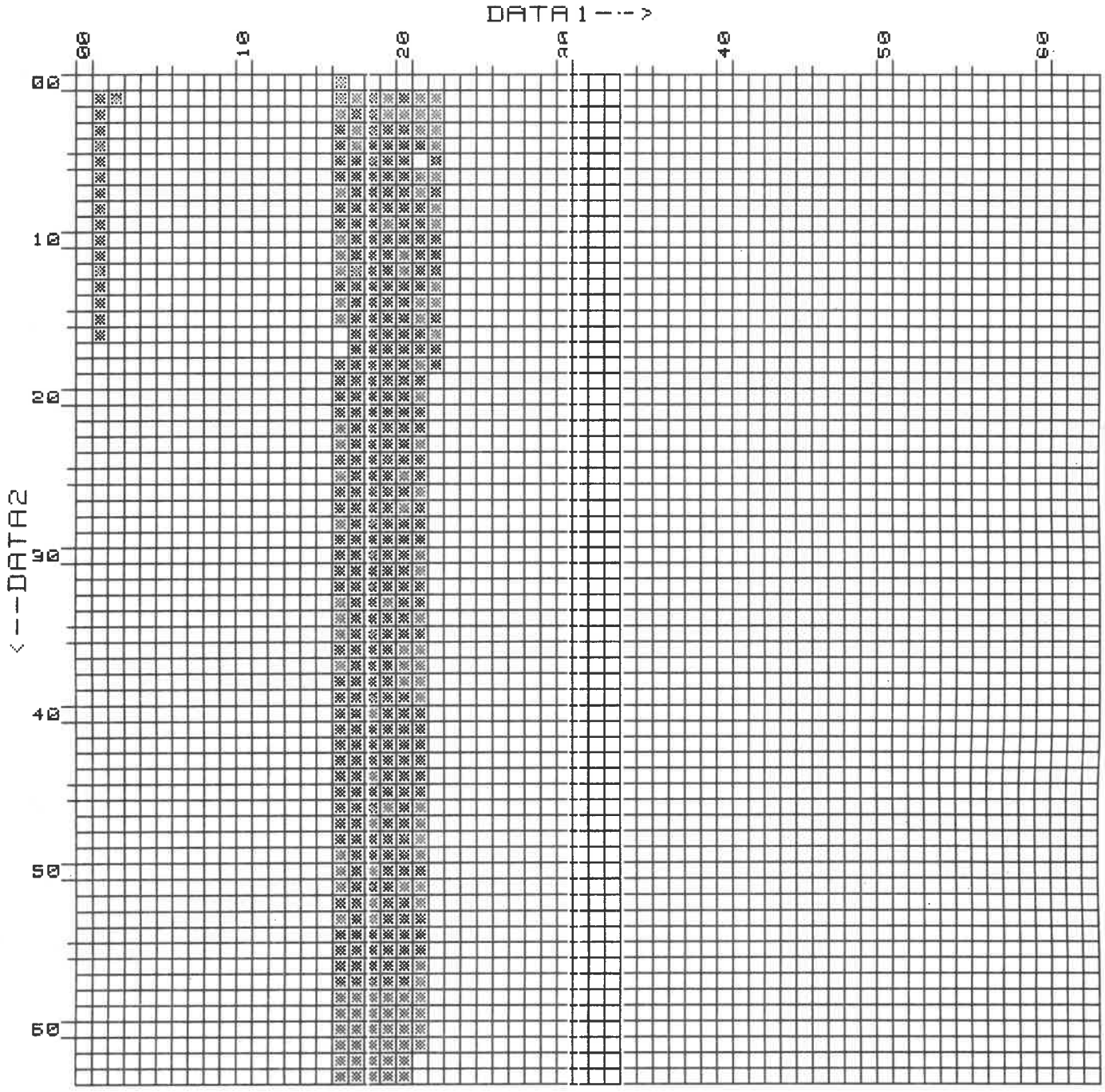
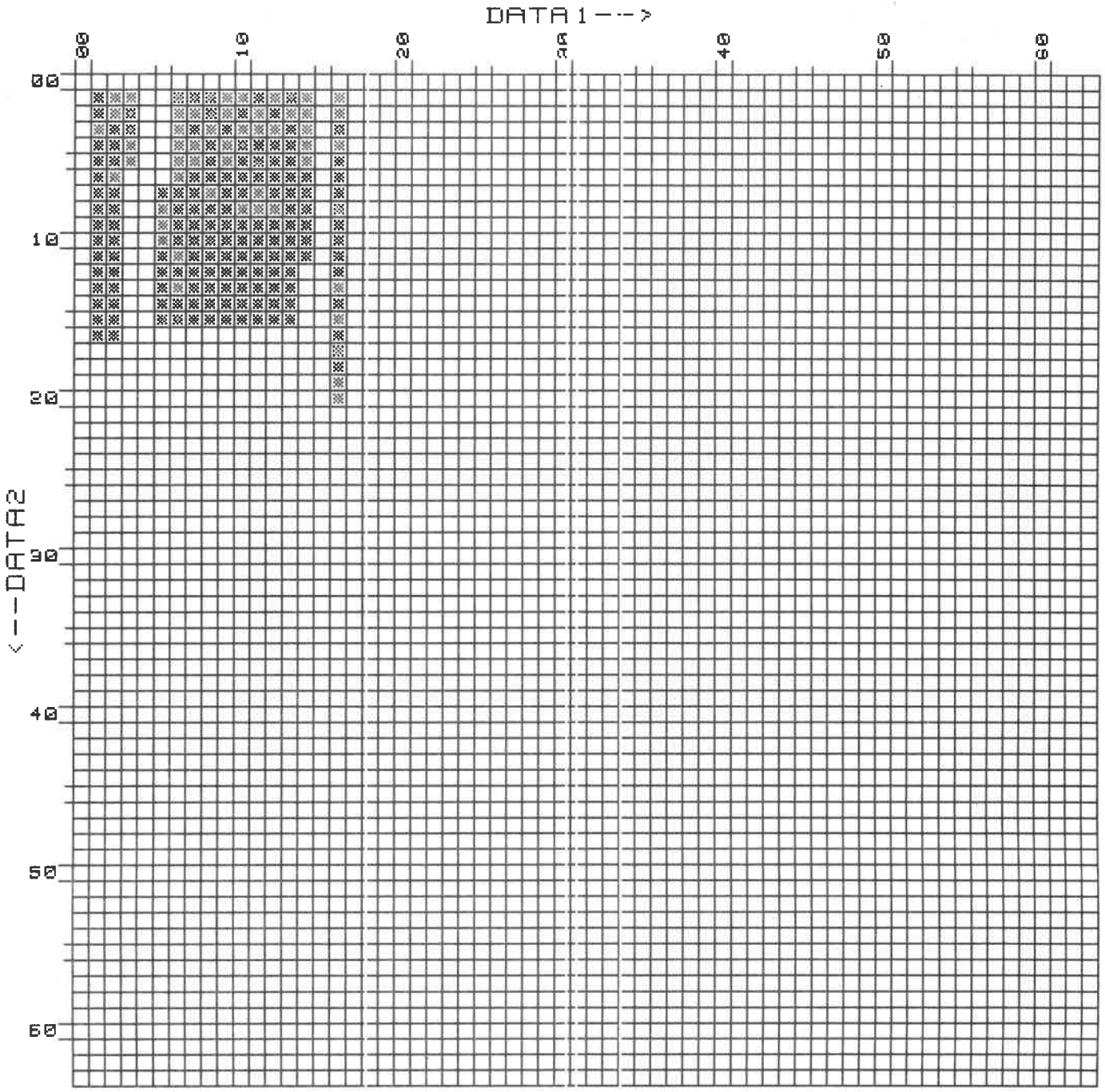


Agency 11 UNIVERSITY OF WASHINGTON, COLLEGE OF FISHERIES
1/7/85



Agency 12 FISH & WILDLIFE BRANCH, PROVINCE B.C.
1/7/85



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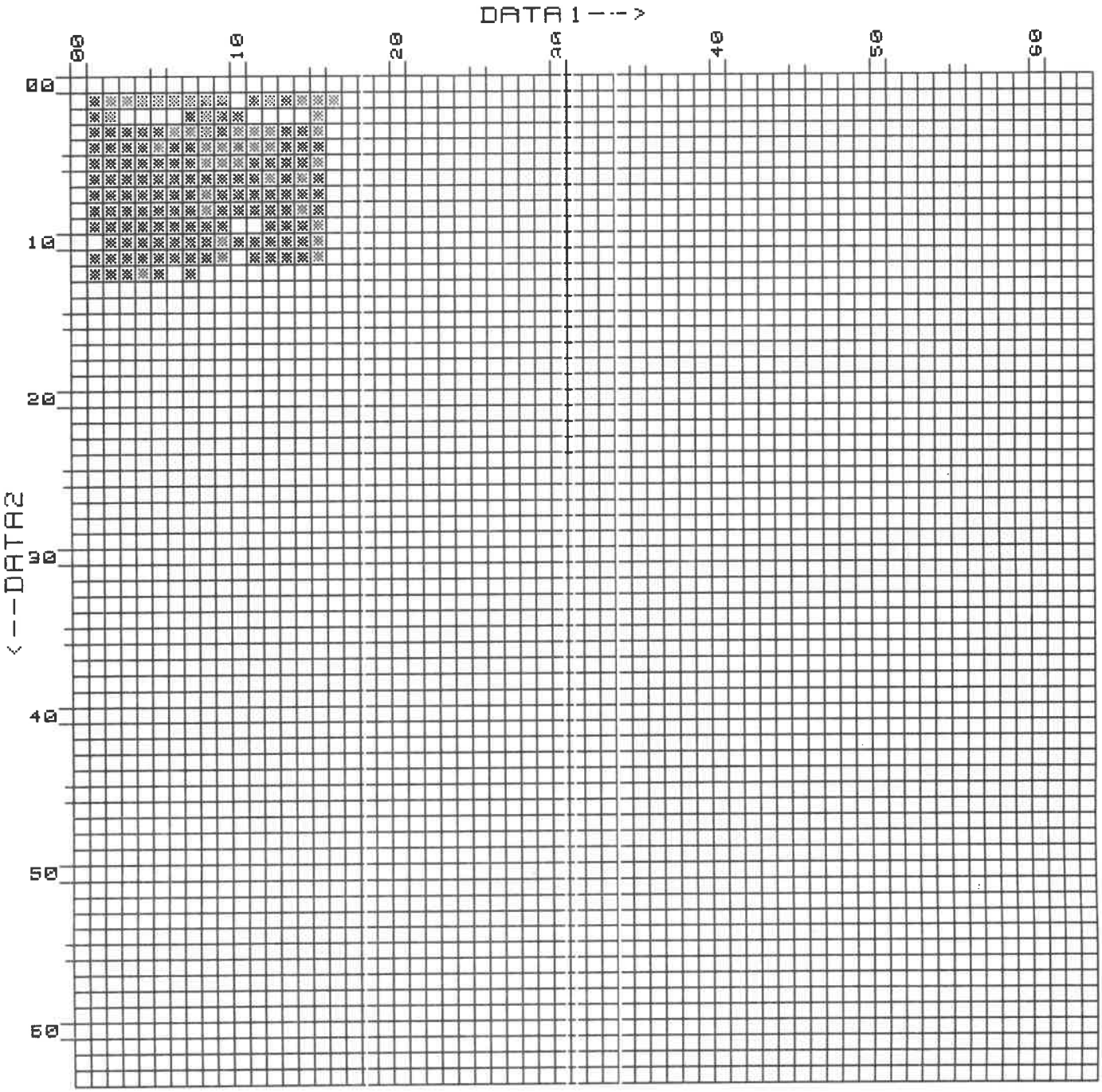
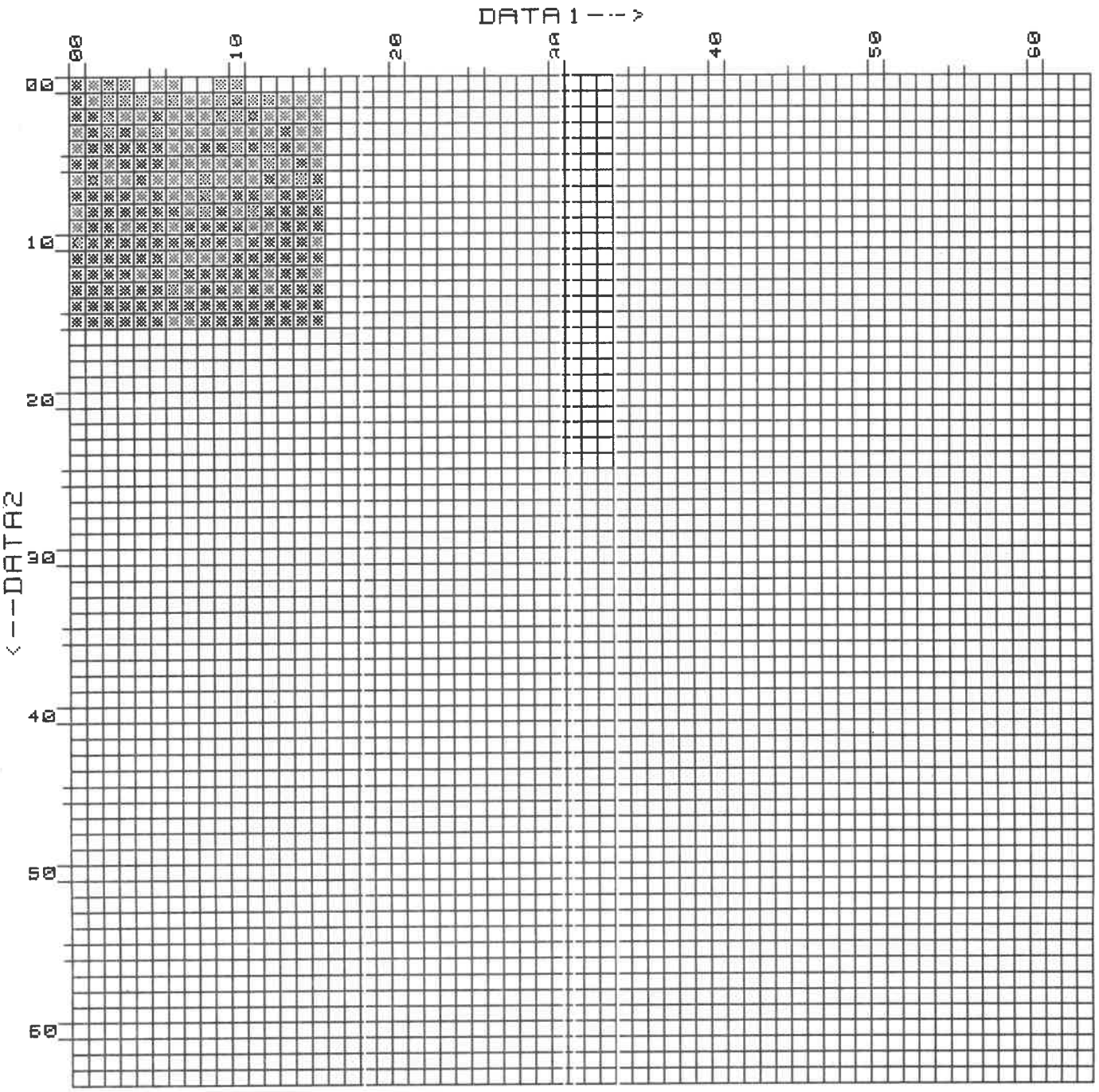


Agency 14 US FISH & WILDLIFE SERVICE
1/7/85



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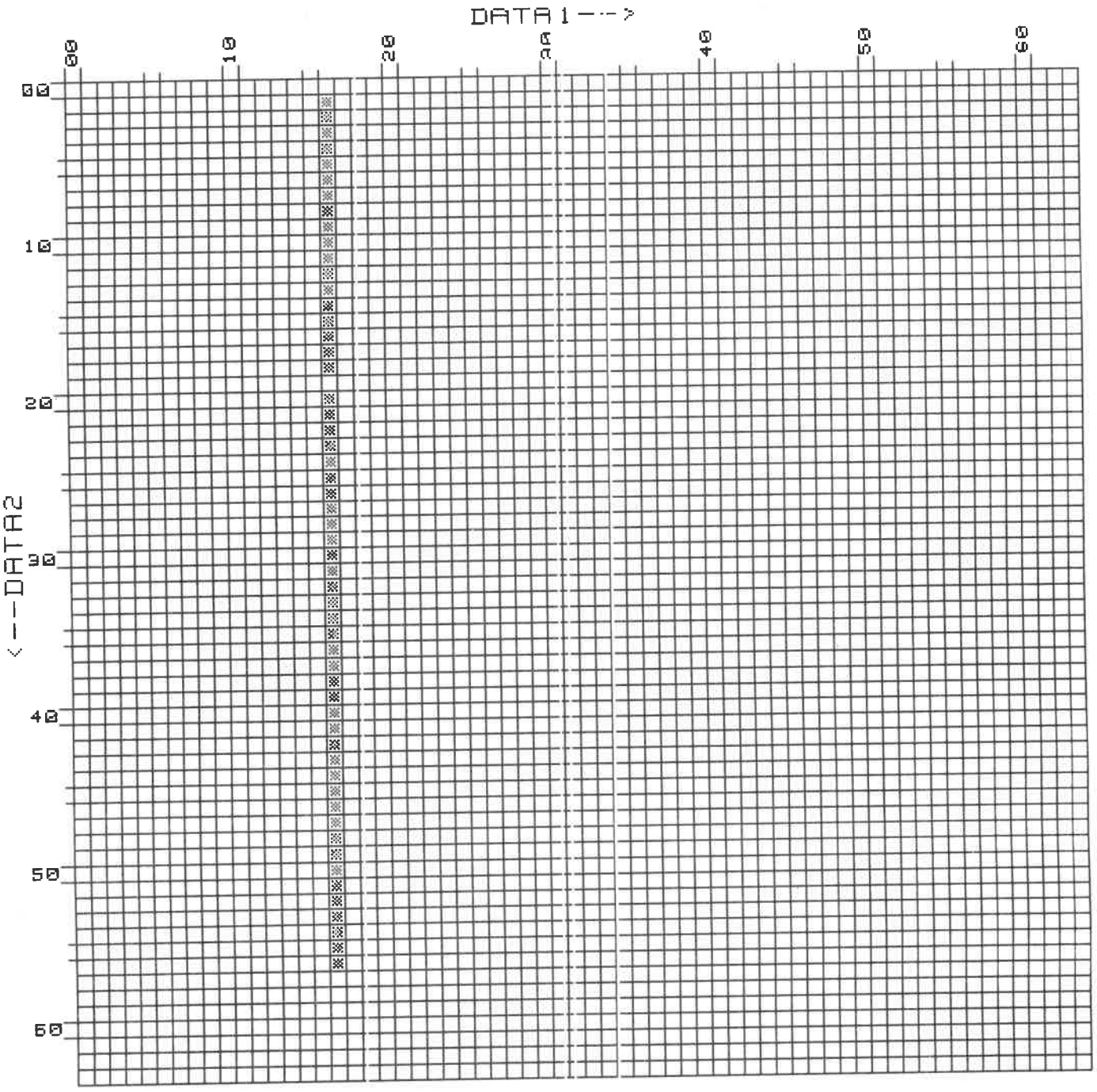
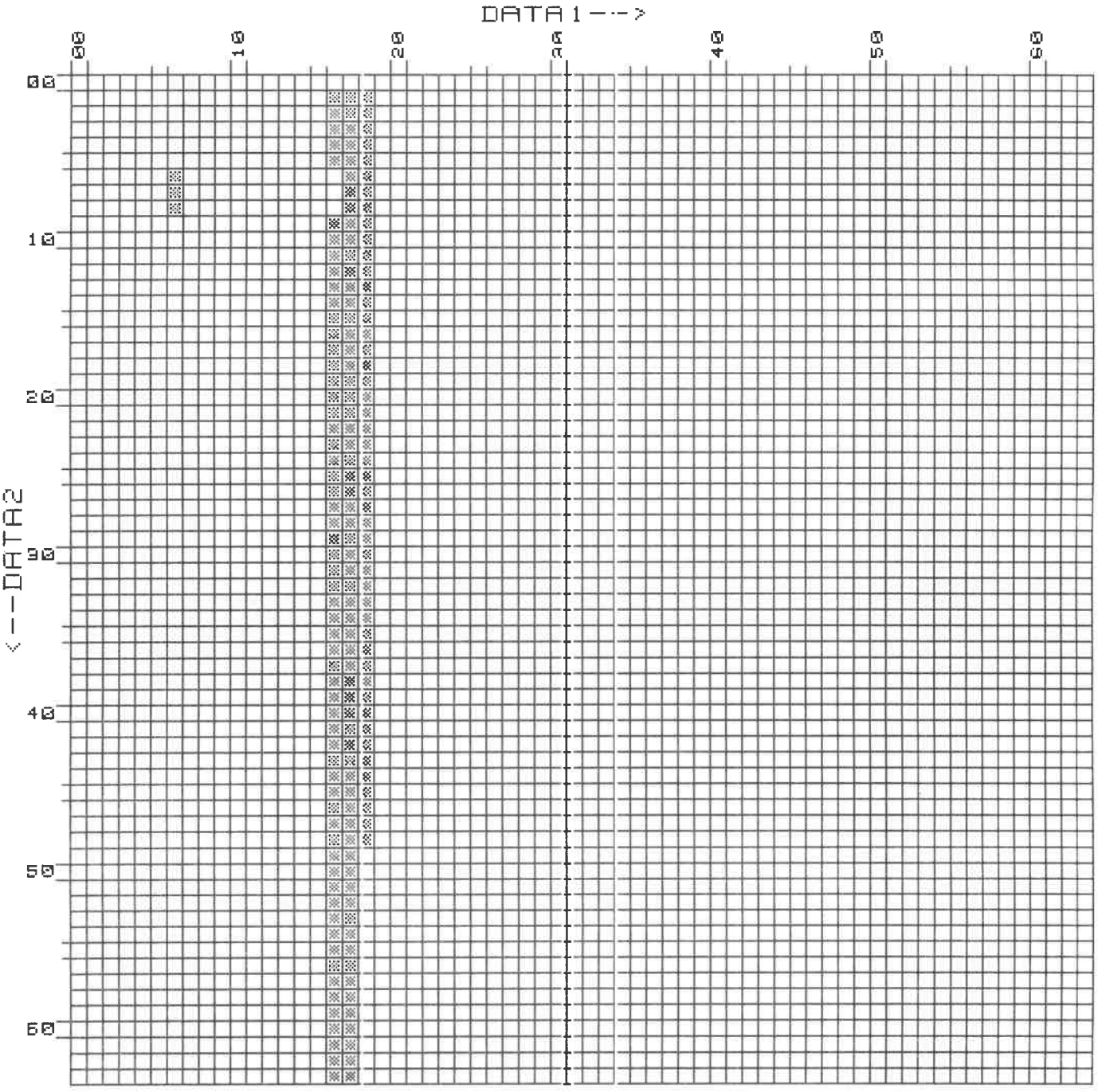
1/7/85

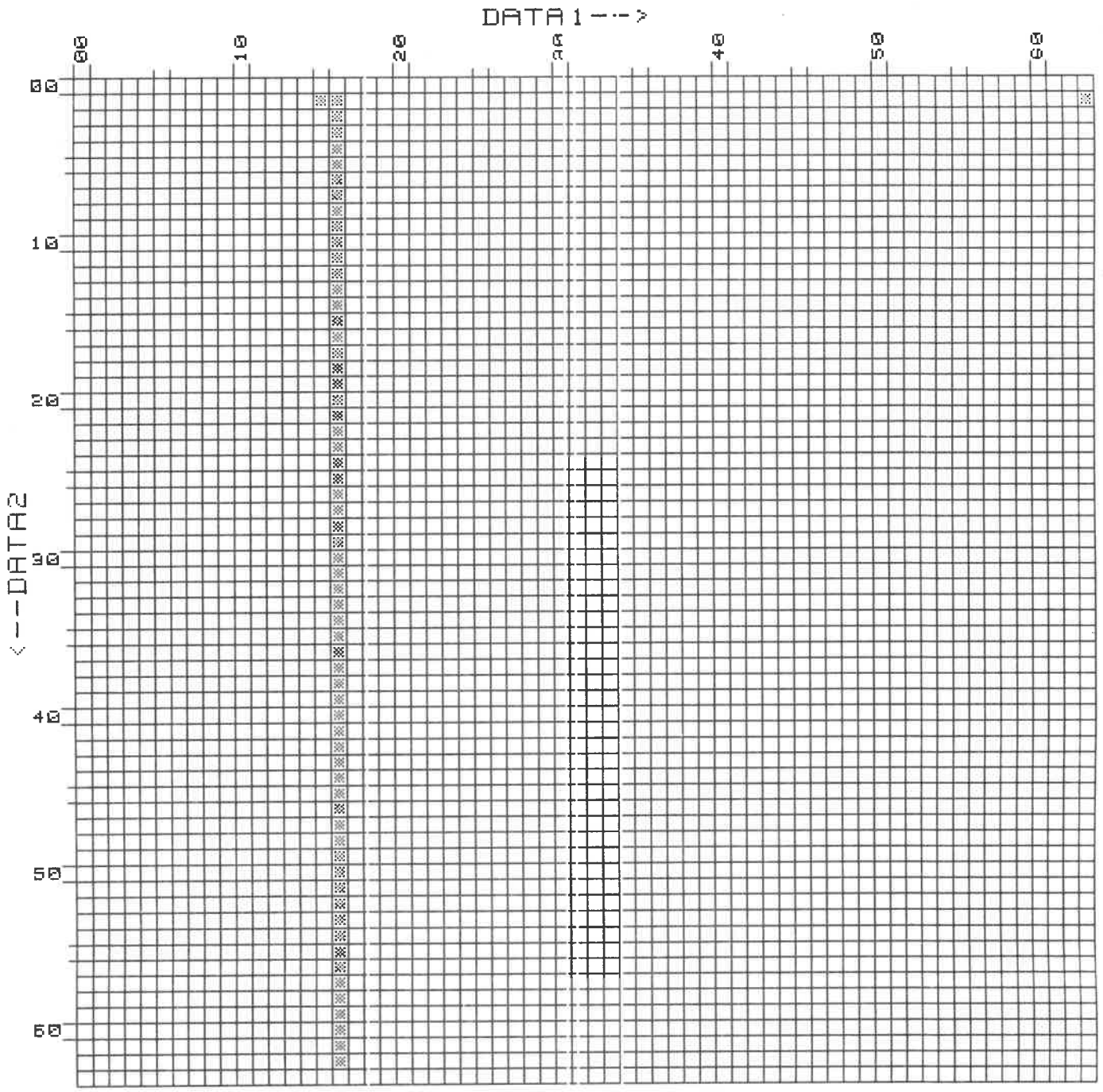


Agency 21
1/7/85

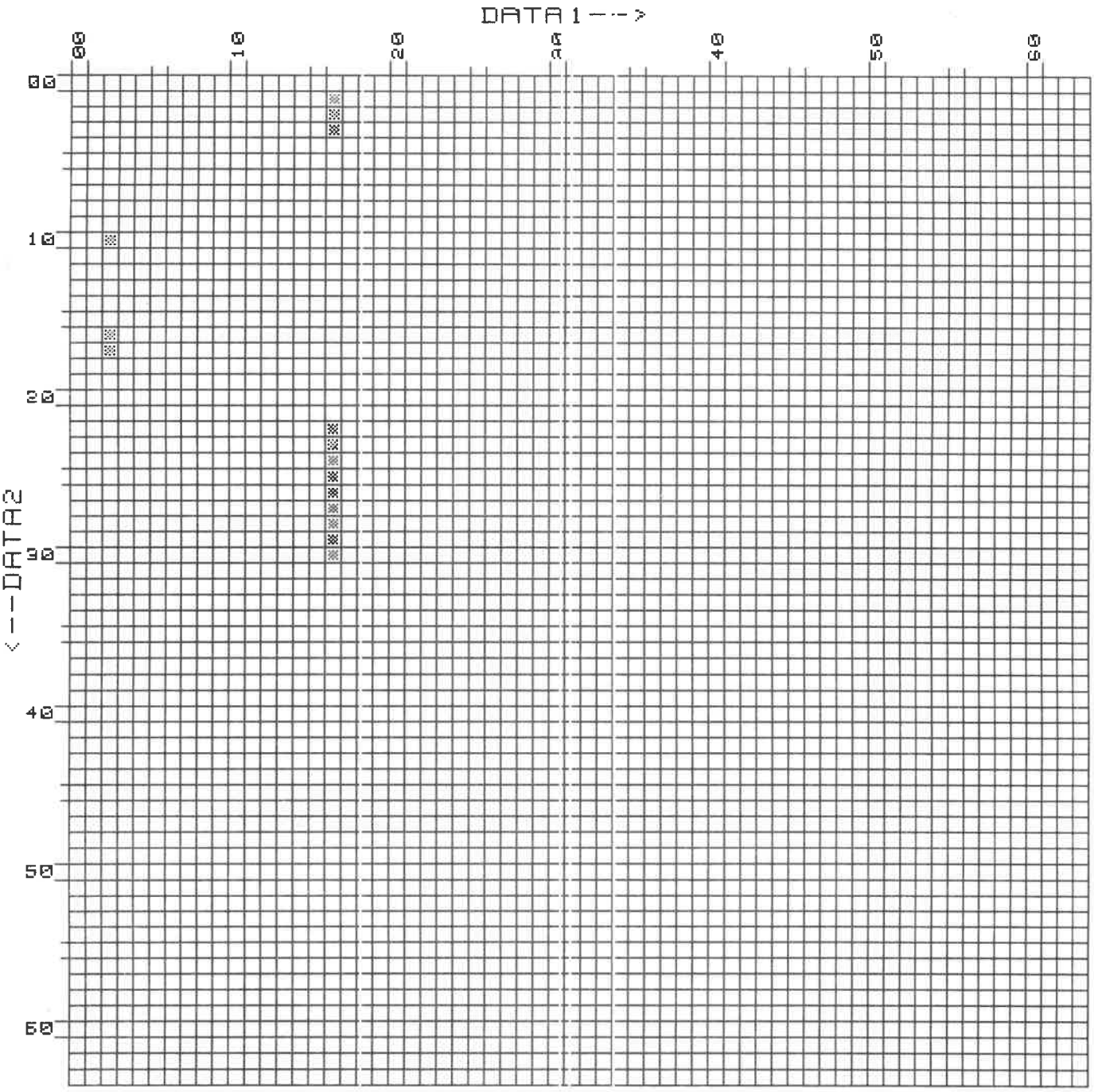
NORTHWEST INDIAN FISHERIES COMMISSION



Agency 23 NATIONAL MARINE FISHERIES SERVICE/COLUMBIA RIVER
1/7/85



Agency 31 SOUTH CENTRAL ALASKA
1/7/85



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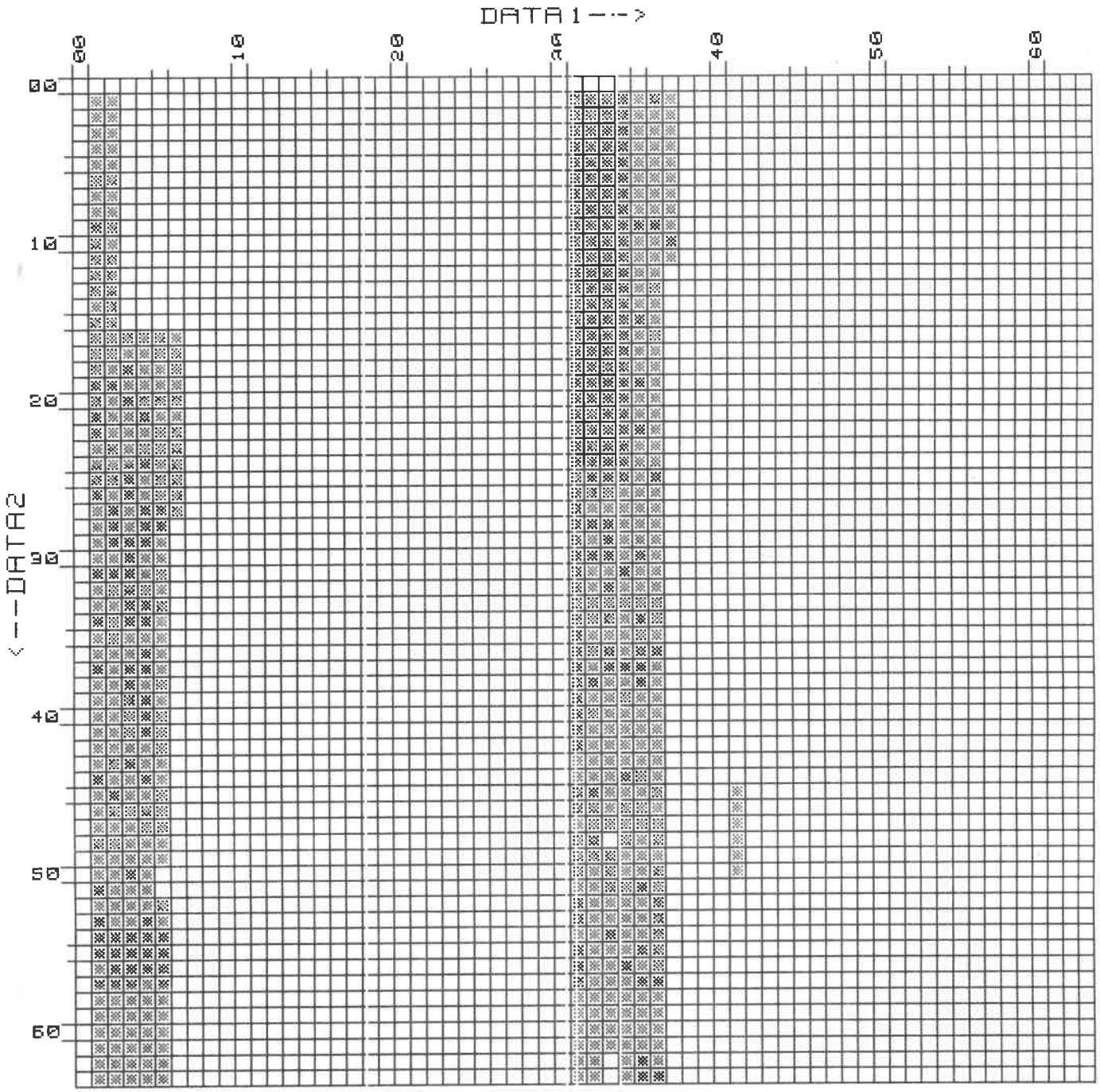
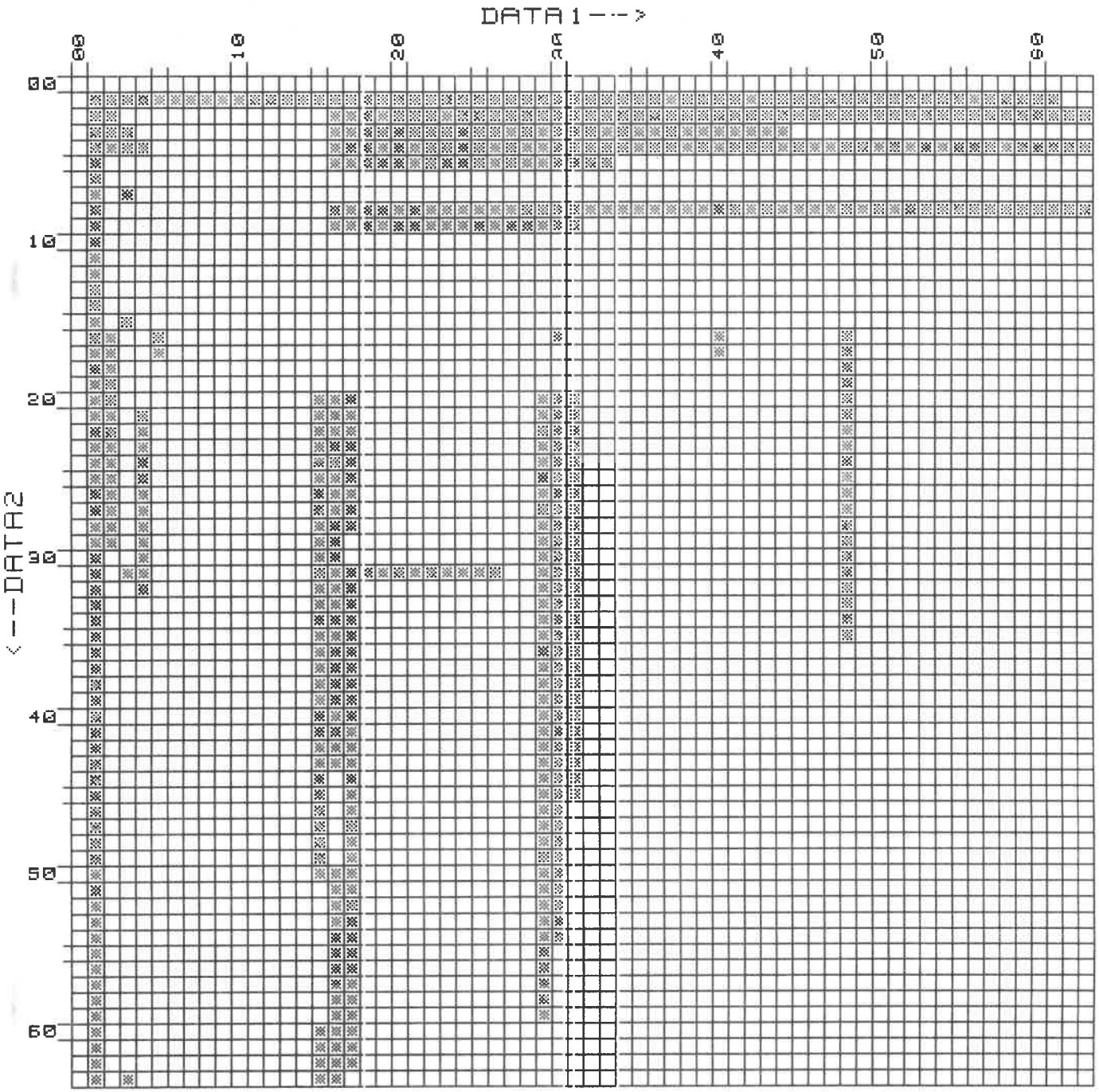
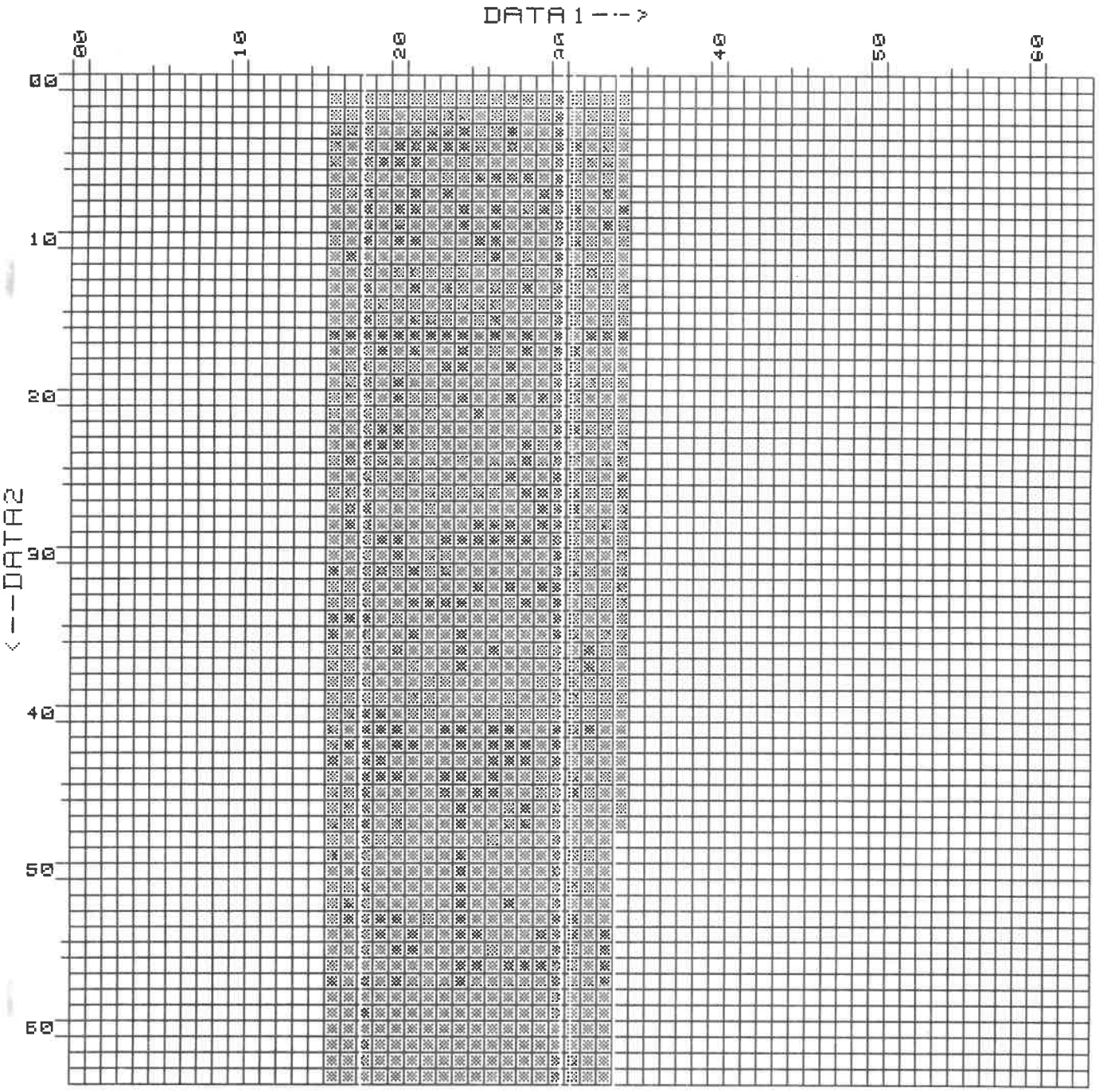


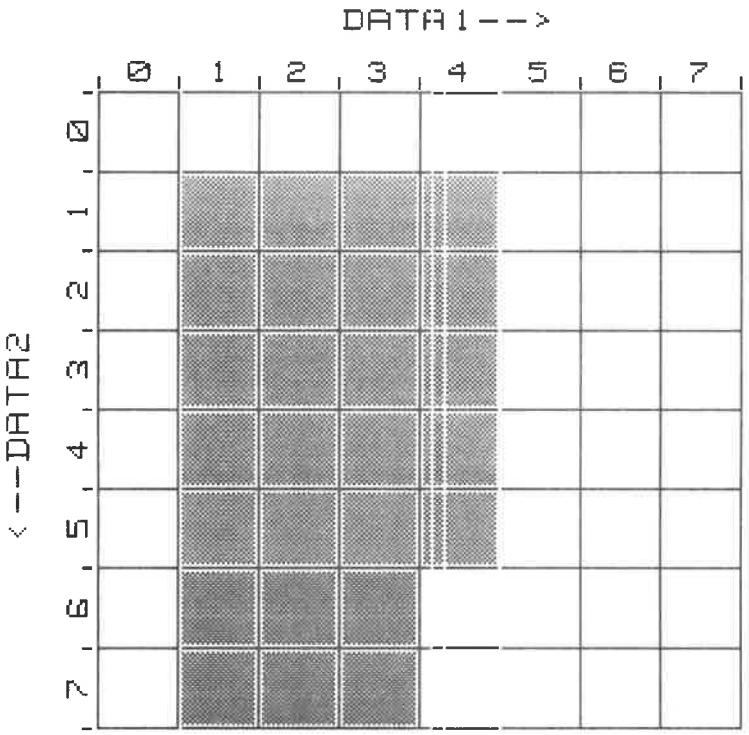
Agency 60 OREGON AQUA FOODS, INC.
1/7/85



Agency 62 MISCELLANEOUS
1/7/85



Agency 63 WASHINGTON DEPT. OF FISHERIES
1/7/85



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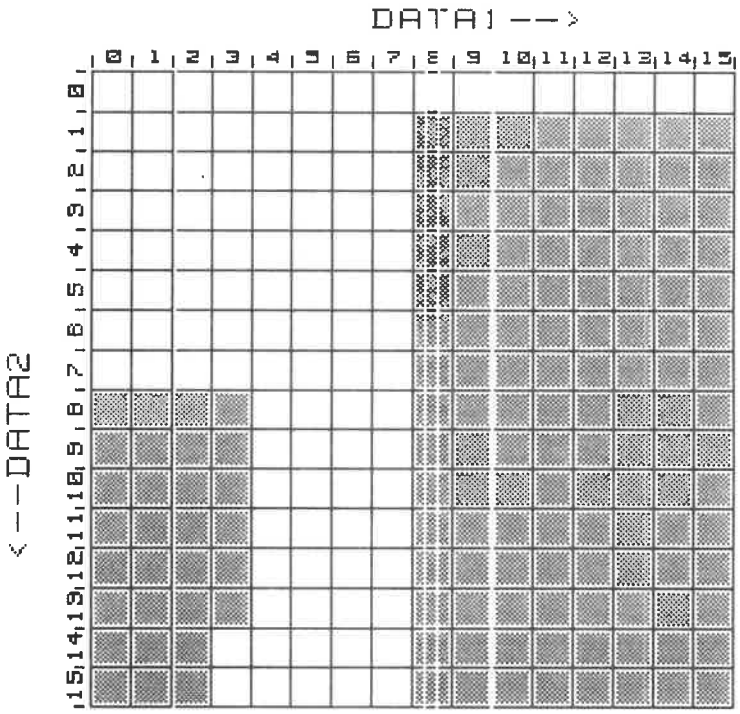

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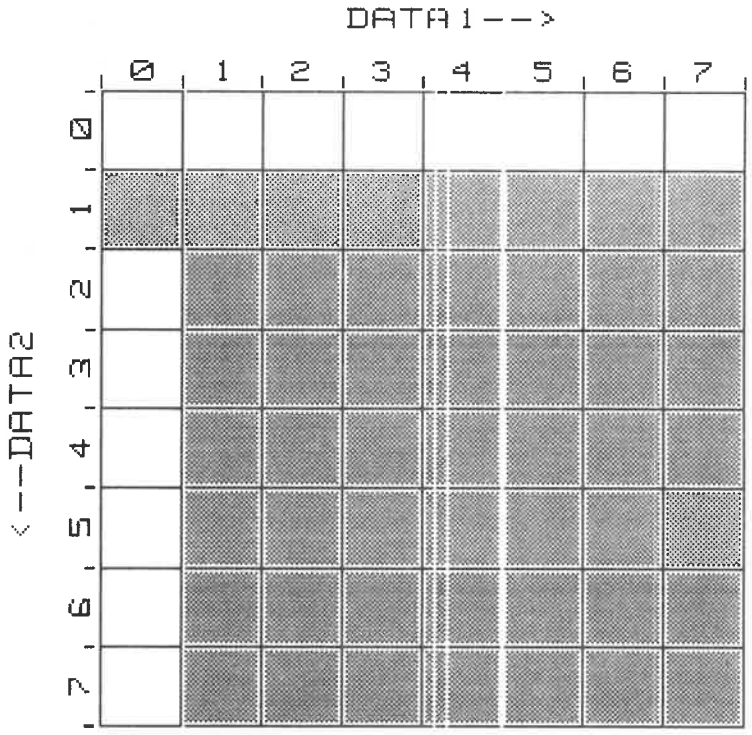
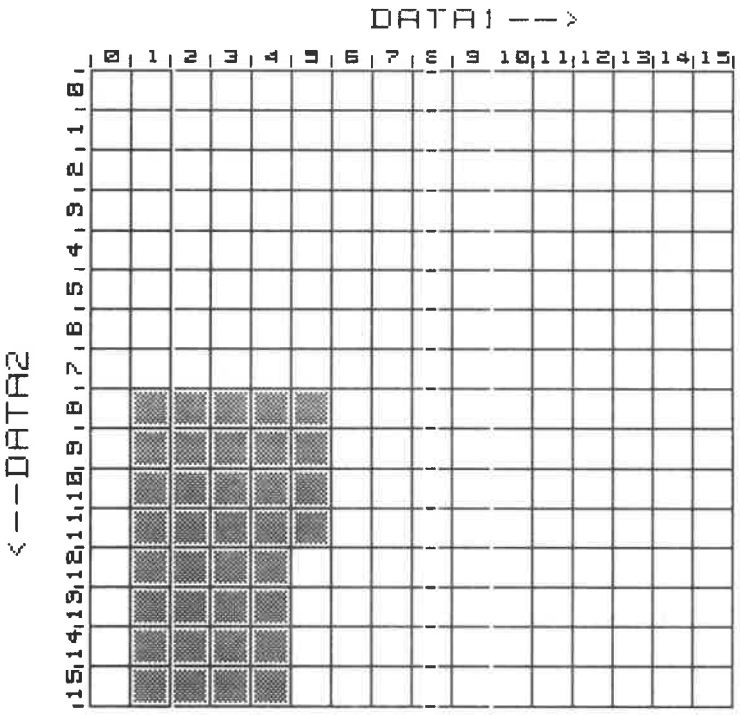


Agency 01 WASHINGTON DEPT. OF FISHERIES
1/7/85



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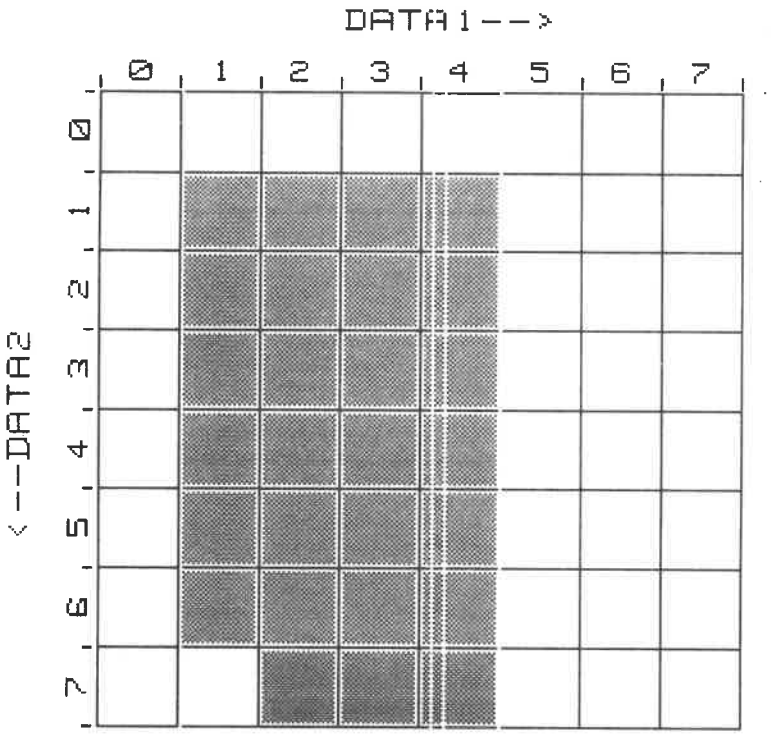
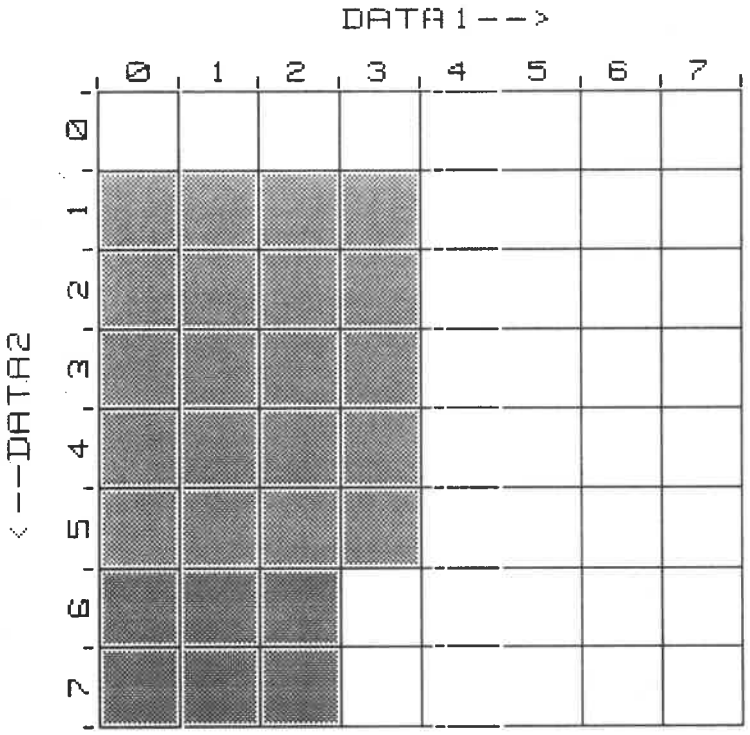
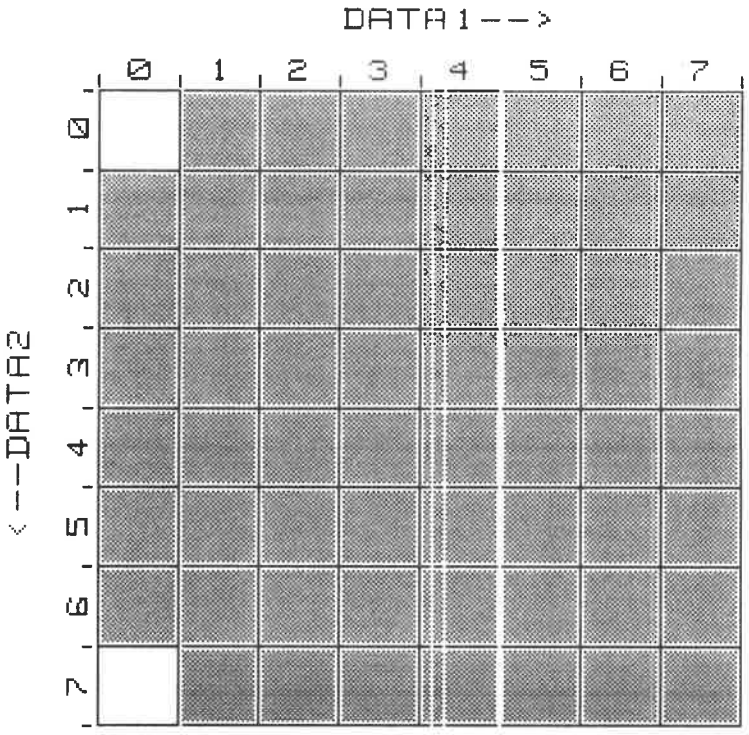


Agency 02 DEPT. FISHERIES & OCEANS, CANADA
1/7/85

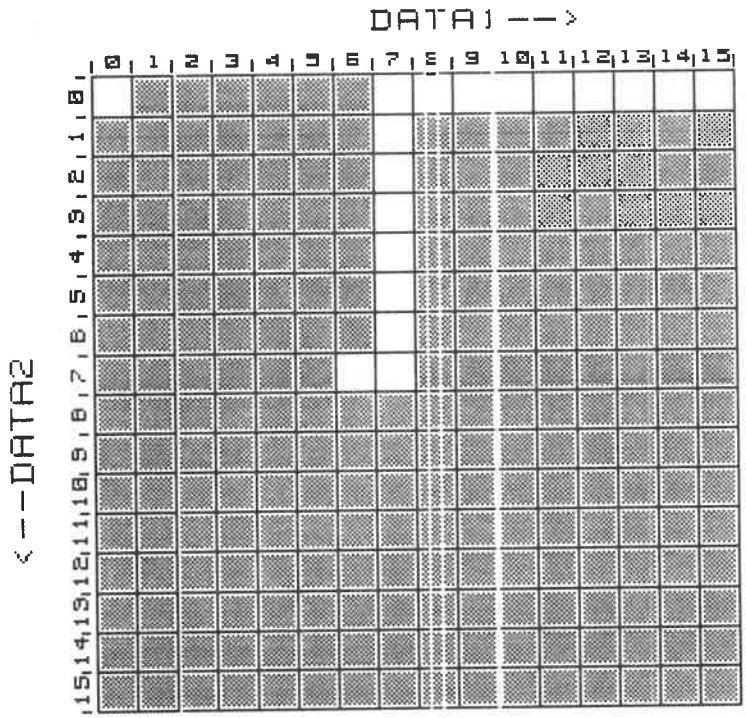


Agency 03 NATIONAL MARINE FISHERIES SERVICE/ALASKA
1/7/85



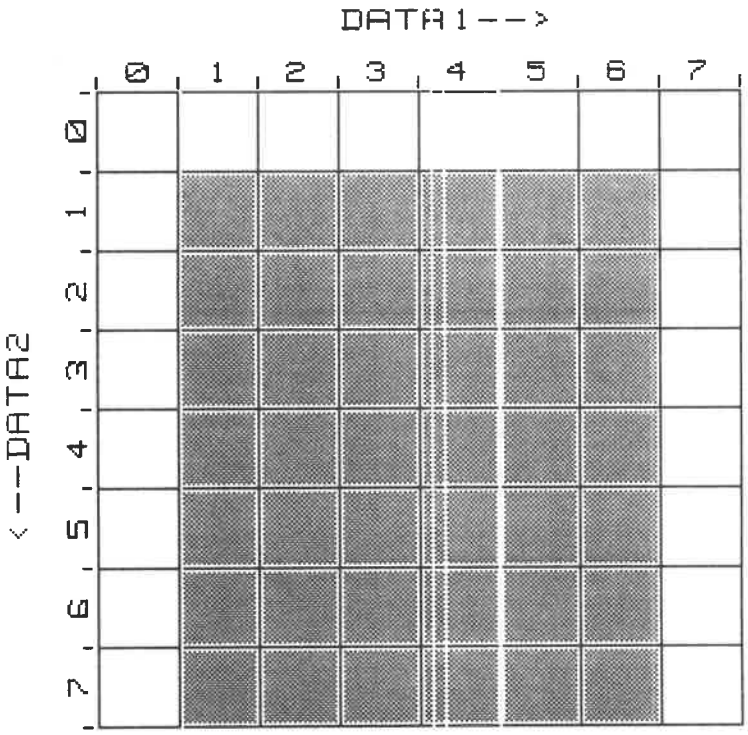
Agency 04 ALASKA DEPT. FISH & GAME

1/7/85



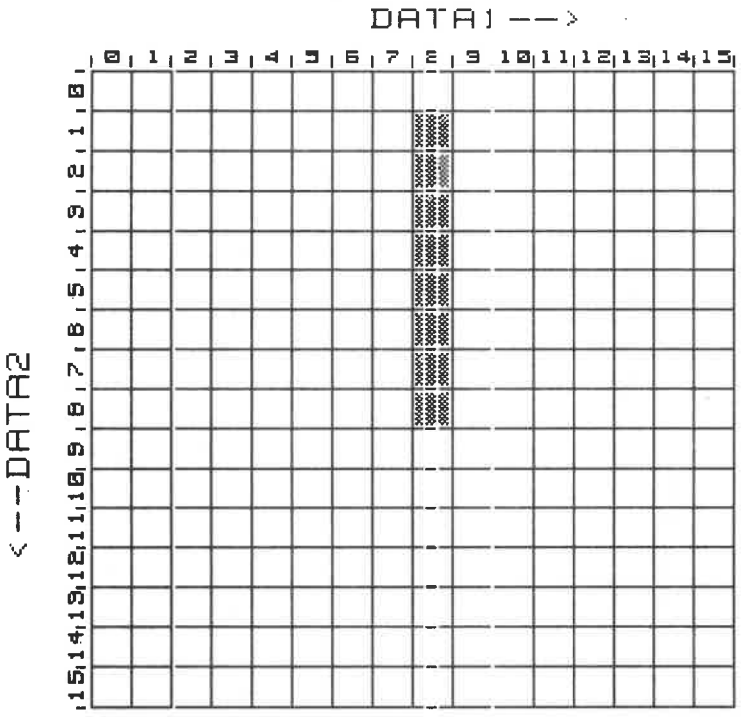
Agency 04B ALASKA DEPT. FISH & GAME

1/7/85



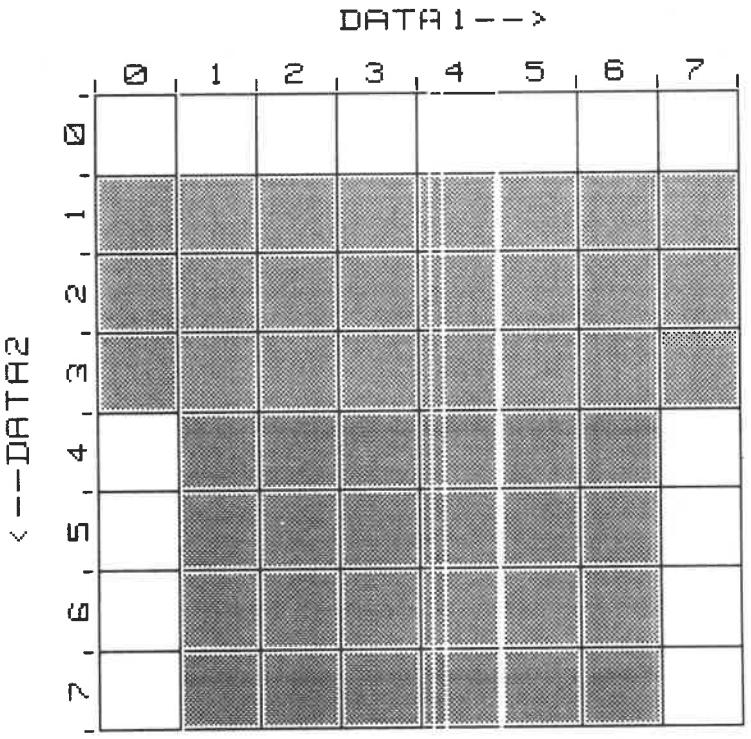
Agency 05 US FISH & WILDLIFE SERVICE

1/7/85

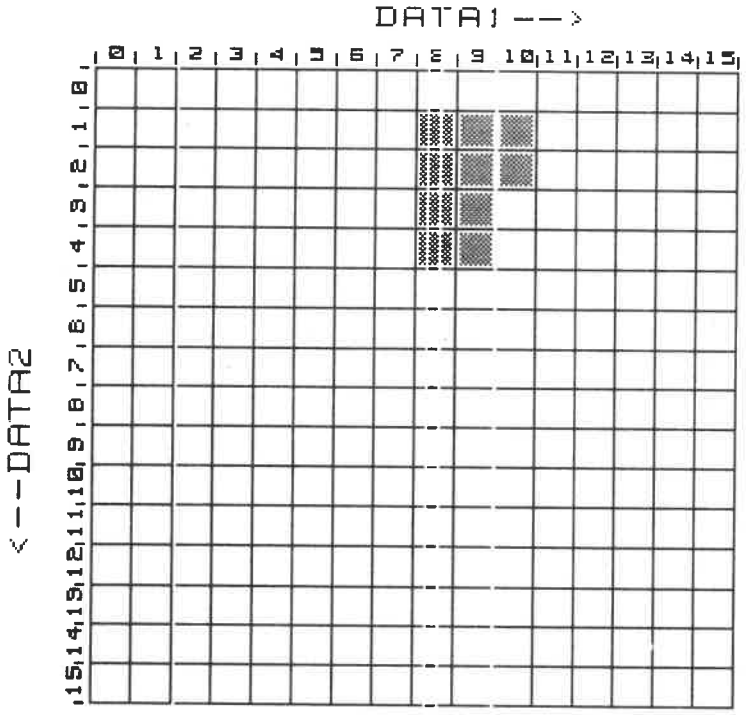


Agency 051: US FISH & WILDLIFE SERVICE

1/7/85

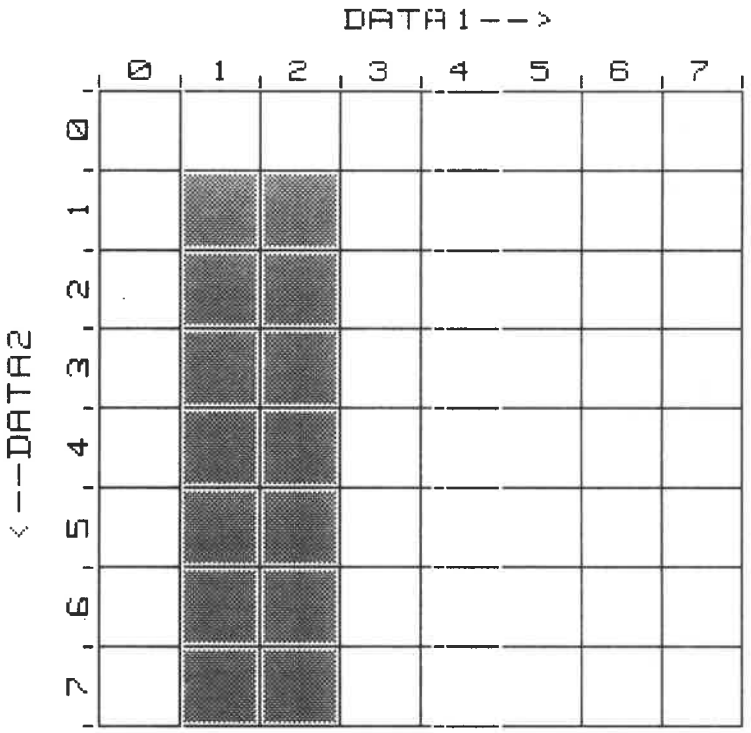


Agency 06 CALIFORNIA DEPT. FISH & GAME
1/7/85

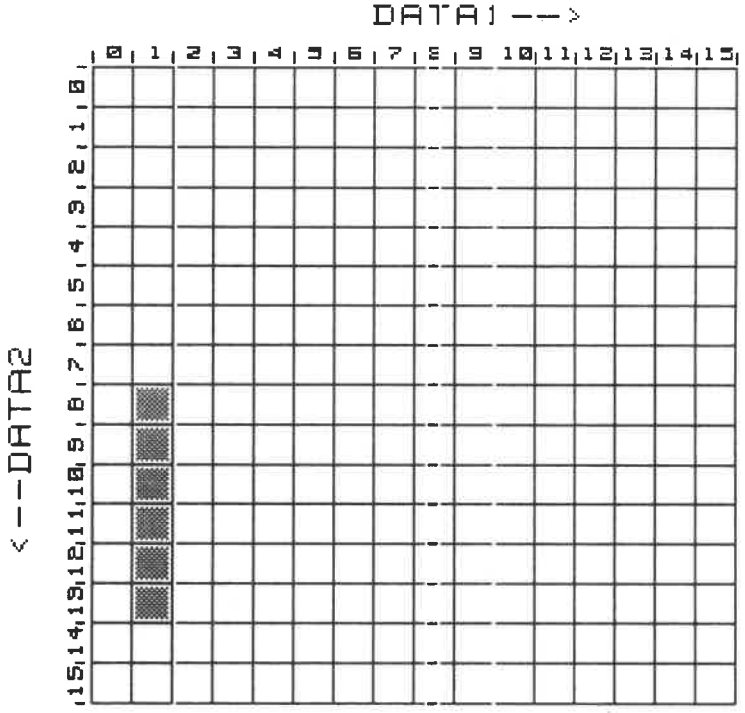


Agency 06B
1/7/85

CALIFORNIA DEPT. FISH & GAME



Agency 07 OREGON DEPT. FISH & WILDLIFE
1/7/85



Agency 07B OREGON DEPT. FISH & WILDLIFE
1/7/85