MARINE MAMMAL DATA DOCUMENTATION FOR THE PLATFORMS OF OPPORTUNITY PROJECT AND OUTER CONTINENTAL SHELF ENVIRONMENTAL ASSESSMENT PROGRAM

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Roger W. Mercer
Bruce D. Krogman
Ronald M. Sonntag

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Northwest and Alaska Fisheries Center
2725 Montlake Boulevard East
Seattle, Washington 98112

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Roger W. Mercer*

Bruce D. Krogman*

Ronald M. Sonntag*

Principal Investigators

Howard W. Braham*

Roger W. Mercer*

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*Marine Mammal Division, National Marine Fisheries Service,
NOAA, 7600 Sand Point Way, N.E., Seattle, Washington 98115

ABSTRACT

Research Unit 68 of the Outer Continental Shelf Environmental Assessment Program is based upon the Platforms of Opportunity Project (POP) which was officially instituted by Marine Mammal Division, Northwest and Alaska Fisheries Center in 1971. The Platforms of Opportunity Project solicits marine mammal sighting data from various sources through a volunteer logbook program. Sighting information is hand and computer processed for computer analysis and magnetic tape storage. Errors can be introduced to the data base by (A) the observers themselves, (B) during transcription of logbook entries onto keypunching abstracts, and (C) during keypunching. Several levels of manual and computerized quality control steps have been instituted to assure that phases B and C above are done accurately and that possible errors made by the observer during phase A are at least double-checked during data processing. After all quality control steps have been made, the data is plotted and tabulated by species, month and geographical area; and, translated to the Outer Continental Shelf Environmental Assessment Program's 027 format for submission to the Environmental Data Service, NOAA.

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Definition of Terms:

Algorithm - An equation or series of equations used in a computer program to derive a value for a variable.

Card Image - An 80 column or character computer format.

GMT - Greenwich Mean Time

QCPI - Version one of the Marine Mammal Division quality control program described in this paper.

Record - Refers to a series of 80 column card images which serve to document a batch of data such as often exists in a 50-page Platforms of Opportunity Project logbook. A record can be a cruise for any given vessel or a season's data from an individual observer or contributing organization.

Record ID - A six digit number applied to all cards within each POP record that uniquely identifies that record from all others within the file.

INTRODUCTION

The Marine Mammal Platforms of Opportunity Project (POP) provides a medium for collection of marine mammal sighting information from volunteer observers with a wide range of experience. The POP is administered by the Marine Mammal Division, Northwest and Alaska Fisheries Center, National Marine Fisheries Service, NOAA, Seattle, Washington; consequently, most contacts with scientists and naturalists have been made on the West Coast and in Alaska. Figure 1 demarcates the area where most marine mammal sighting reports originate.

In June 1975, the Marine Mammal Division began an environmental assessment program of the waters adjacent to Alaska with the primary objective of determining seasonal distribution and abundance of marine mammals (C. F. Fiscus, et al 1976). Funded by the Department of Interior, Bureau of Land Management (BLM), the program is part of the U.S. Outer Continental Shelf Environmental Assessment Program (OCSEAP), administered through the National Oceanic and Atmospheric Administration (NOAA), Environmental Research Laboratory, Boulder, Colorado, and Juneau, Alaska.

The POP was supported indirectly under OCSEAP Research Unit 68, (RU-68): Seasonal Distribution and Relative Abundance of Marine Mammals in the Gulf of Alaska. Increased research activities on the continental shelf of Alaska attributable to OCSEAP have resulted in a dramatic increase of data received by POP (Figure 2).

The purpose of this report is to provide detailed documentation of data management for the Marine Mammal Division's POP. This documentation serves three purposes: 1) insures that quality control within the project will be maintained; 2) allows the project to continue with minimal perturbation due to the inevitable changes in personnel that occur during any ongoing project; and 3) provides users of data transmitted to the Environmental Data Service, NOAA with a complete description of where, when, and how the data were compiled and its strengths and weaknesses.

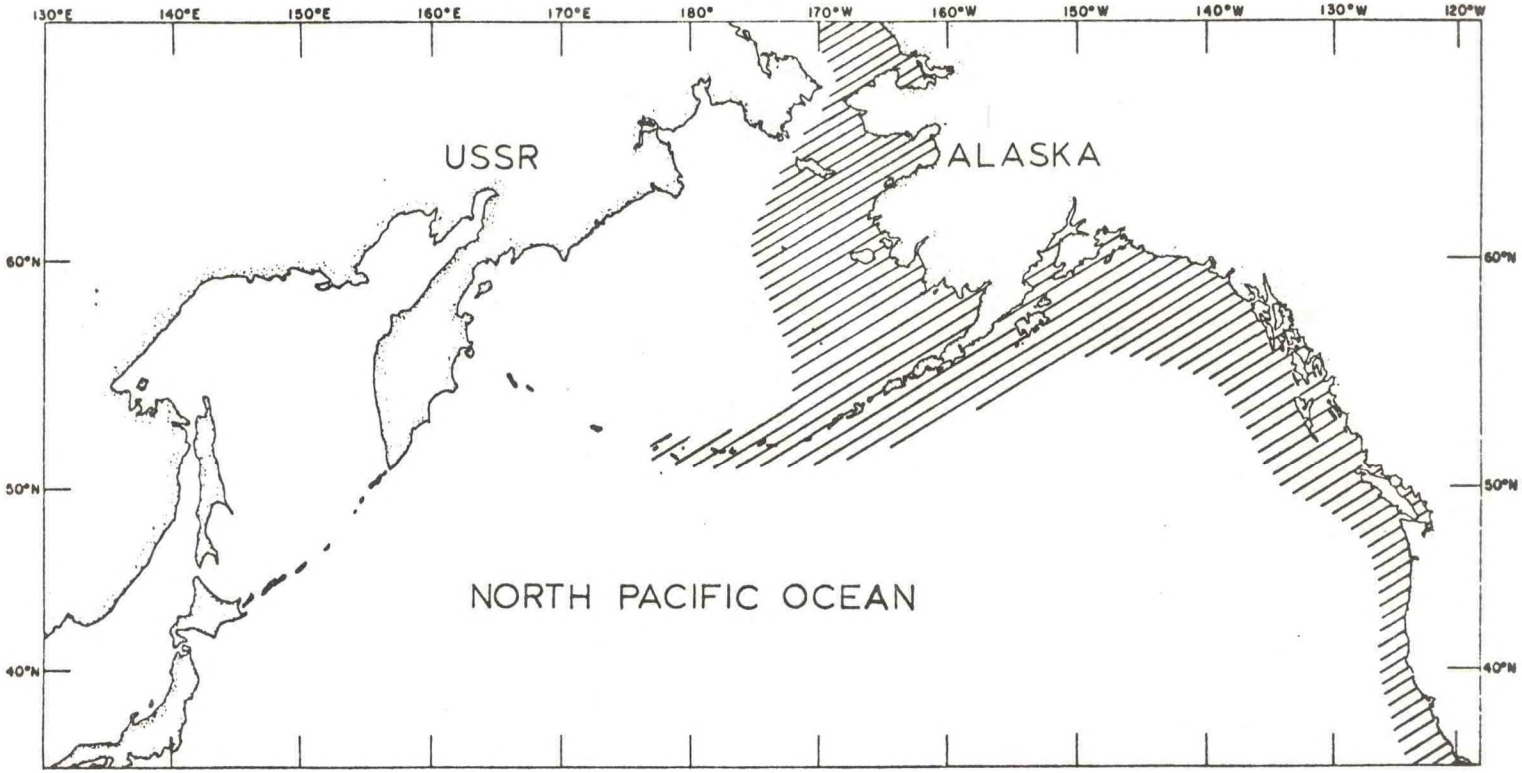


FIGURE 1.--Study area map with shaded portion depicting area where most Platforms of Opportunity marine mammal sightings are made.

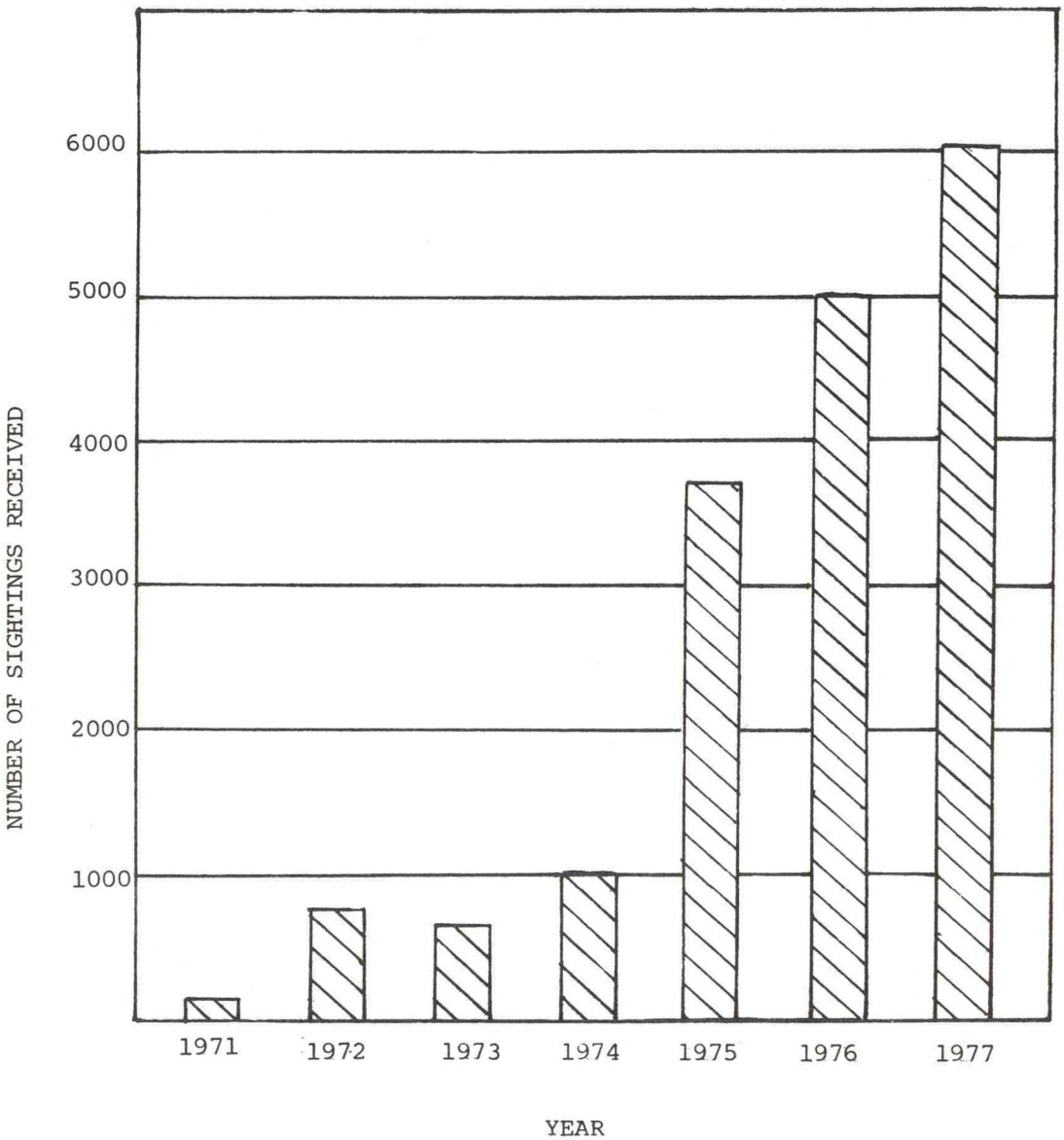


FIGURE 2.--Number of marine mammal sightings collected by the Platforms of Opportunity Project (Outer Continental Shelf Environmental Assessment Program, Research Unit 68).

DATA ACQUISITION AND ARCHIVAL

Data Sources

Platforms of Opportunity Project data sources, consistent with the nature of the project, ranged from NOAA and U.S. Coast Guard vessels recording effort and sighting data by official directive, to the weekend boating enthusiast reporting an occasional marine mammal sighting. Organizations which have contributed data to the Project are described below:

National Oceanic & Atmospheric Administration

Pacific Fleet:

The fleet of the National Ocean Survey, NOAA, based out of the Pacific Marine Center, Seattle, first began reporting marine mammal sightings for the project in 1972. Vessels of this fleet, used as platforms for carrying out marine research and surveys over much of the North Pacific Ocean, are now participating in the program on a routine basis. A large proportion of the data received by the program is obtained through this source. The OCSEAP has required reactivation of three additional NOAA vessels; these vessels have been active along the continental shelf and slope underlying the Gulf of Alaska and the Bering Sea through much of 1975 and 1976. Each of these vessels has an officer who, in addition to regular duties, is responsible for collecting data and providing identification material to the bridge watch. Two types of reports are submitted by the NOAA fleet: the non-OCSEAP contracted vessels prepare summary reports to accompany the Marine Mammal Logbook and the OCSEAP contracted vessels (DISCOVERER, SURVEYOR, and MILLER FREEMAN) record data in the OCSEAP Marine Operations and Station Abstract (MOSA) a copy of which is routed to Marine Mammal Division from the Juneau OCSEAP office.

U.S. Coast Guard:

Since 1972, the U.S. Coast Guard has been cooperating in developing a program for reporting marine mammal sightings. Marine Observation Reports have been printed for recording marine mammal watch effort and sightings. Approximately 2,000 sighting reports have been received from this source. These sightings are from vessels operating along the U.S. Continental and Alaskan coasts.

Alaska Trollers' Association

The Alaska Trollers' Association Logbook Program commenced in 1976 with some 50 fishing vessels participating. Data recorded in the logbooks developed especially for the program include marine mammal observations. This is a cooperative program involving the Alaska Trollers' Association, the Alaska Department of Fish and Game, The National Marine Fisheries Service (NMFS), Alaska Sea Grant Program, and the University of Alaska.

National Marine Fisheries Service, Enforcement:

Agents of the Alaska Regional Law Enforcement and Marine Mammal Protection Branch, NMFS, based out of Juneau, Alaska, have been reporting marine mammal sightings incidental to surveillance activities since 1972. Surveillance was conducted from U.S. Coast Guard vessels and aircraft operating within the U.S. contiguous zone until 1976 and thereafter out to the 200 mile fisheries management boundary.

International Pacific Halibut Commission:

Scientists and personnel of vessels chartered by the Commission for halibut research have been recording incidental marine mammal sightings since 1972. Most of the observations contributed by the Commission have come from the western Gulf of Alaska and southeastern Bering Sea.

U.S. Forest Service:

Naturalists of the U.S. Forest Service have contributed sighting data from southeastern Alaska and Prince William Sound each year since 1971. In the Whale Watch Program, naturalists show interested ferry passengers how to identify marine mammals common to local waters; the passengers then watch for and report sightings while travelling between ports.

Other contributors:

In addition to larger organizations, many smaller groups and independent observers have been contributing to POP by reporting sightings of marine mammals.

Field Formats and Data Receipt

Field formats vary with data source, but certain types of information are necessary for a valid observation to exist. Information must be provided on: species identification; number of animals seen; date (at least year and month); and location of sighting. Animal behavior and environmental data are desirable but optional. As a means of documenting observation effort, observers are requested to record the time and position on the chart at the beginning and end of each watch period.

The POP receives most of its data by mail in five basic styles or formats:

Source and format	Percentage
POP Logbook	45%
OCSEAP Marine Observation and Station Abstract	20%
U.S. Coast Guard Marine Observation Report	10%
U.S. Forest Service Abstract	10%
Alaska Trollers' Magnetic Tape	10%
Miscellaneous	5%

The appendix provides descriptions and examples of the first four of these data sources and formats with accompanying examples of how they are coded into the POP format.

Data from the Alaska Troller's Association were coded by the Alaska Department of Fish and Game in 1976 and by the University of Alaska in 1977. Two different computer formats were used, but the codes for information of interest to POP were not significantly different. Data from Alaska Trollers' tapes were transformed into the POP format by computer program and, consequently, were not subject to human recording errors during transformation.

Computer Formatting:

The Marine Mammal POP uses volunteer observers of varying abilities and motivations aboard many different types of vessels and aircraft. As a consequence, the data received vary considerably in quality and quantity from observer to observer. These data are screened as they are coded to insure that only valid sightings are entered into the POP raw data computer file.

Basic information extracted from the logbooks includes where, when, and what marine mammal was seen and how many there were. Species identification should always be accompanied by explanatory notes on features used for identification unless the source of data is known to be reliable. In some cases, data are screened by contributing organizations and have been assumed to be reliable (see Appendix p.87).

Format and File Logic

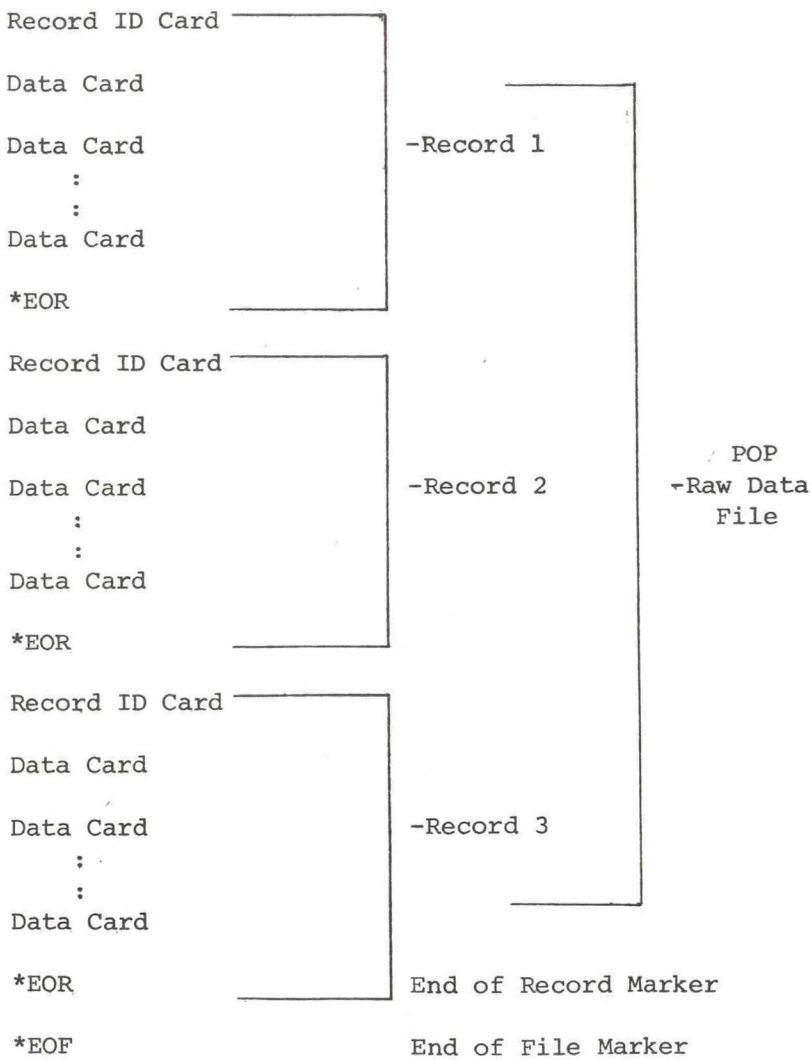
The POP format is hierarchical in structure. The fundamental unit of information is the variable. Variables are arranged on 80-column cards, and are referred to as card images (occasionally referred to as CI's). Two types of card image formats are employed in the POP system: data cards (See Appendix) contain all data within a record; and a Record ID card is used at the beginning of each record to briefly describe that record (Figure 3 and Appendix). A number of card images which contain information attributable to the same source constitute a record. A number of records constitute the POP raw data computer file. An end-of-record marker (CDC6400, NOS/BE Operating System)[1/] separates records within the POP file. At the end of the file is placed an end-of-record marker followed by an end-of-file marker. Table 1 depicts the POP file logic.

Each record contains information acquired from a single source. These sources are usually identified as a single ship cruise with one or more observers. Occasionally, it is impossible to classify the data as coming from the same ship cruise. When this situation occurs, the data must be categorized as coming from some source which might be the person who collected the data or the organization which transmitted the data to POP.

The source is described by the variables, Platform Type and Source ID. Each CI within a record must have the same Source ID. Since it is possible to receive data having the same Source ID but coming from different cruises, each record is assigned a unique Record Identifier (RID) code. Each card image within a record must have the same RID in columns 1-6 (for further explanation refer to Appendix page 52).

1/ Reference to trade names is required to uniquely identify equipment used and should not be interpreted as an endorsement by the authors of any particular product or manufacturer.

TABLE 1.--POP raw data file logic. Each computer card is defined as a card image (CI). A record is a set of card images having the same source code. The first card image of each record contains summary information describing the contents of the record. Each record is separated by an end-of-record (EOR) marker. At the end of the file is placed an end-of-file marker (EOF).



Sighting data are arranged in chronological order within each record. Records are added to the end of the POP raw data computer file after the manual quality control stages are complete; consequently, records exist on the computer file in random order. Raw field logs for each computer record are filed alphabetically (by vessel or source name) and by year class in the POP raw field log files. Record ID's are included on the file folder as a cross indexing system with the computer files.

Occasionally, times and positions of transitting ships are provided to such detail, during periods when observers are expending some watch effort for marine mammals, that POP personnel can categorize these data as transits. A transit is any pair of data cards which, through the use of a variable called Flag, define a ship's trackline.

Certain information must be present (exist) for each card image. All variables must be present on Record ID cards (Appendix, p. 52). For data card images, variables which must exist are: RID, Year, Month, Platform Type, Platform ID and Time Zone (see Appendix). Additional information must exist on data card images according to the following conditions:

1) If the card image marks the beginning or ending of a transit, variables describing time and position must be filled out to whole minutes and the variable Flag must exist.

2) If the card image contains information collected during a transit, then variables describing either time and/or position must be filled out to whole minutes. Additionally information must be provided describing species and number sighted and/or environmental conditions via codes and/or comments.

3) If the card image contains information collected while not on transit, then positions must be filled out at least to the whole degree of latitude and longitude, the date must include year and month, and information must be provided describing species and number sighted and/or environmental conditions via codes or comments.

Tables 6 and 7, in the quality control section, provide explicit descriptions of variable relationships and logical dependence in and between card images.

QUALITY CONTROL

Introduction

Success of the POP depends on the development of a large data base system which is free of errors. Not only can results of data analysis be confounded by errors in data, but data processing itself may be impeded.

Since it is nearly impossible to locate and correct all errors in a large data base, it is important that an accurate account be made of those tests for errors which have been performed. By doing so, users of the data will better know strengths and weaknesses of data upon which they conduct their analyses. Most importantly, the user will be better able to discriminate between legitimate outliers and outliers which result from real errors.

Data transcription and manual checking

Data is transcribed from raw data sheets to keypunch abstracts according to POP formatting directions (see Appendix). The keypunch abstracts are then 100% manually checked against raw data sheets to assure accurate transcription. The checking process is independent of the transcription phase and is usually carried out by two people. As discrepancies between raw data sheets and keypunch abstracts are encountered, abstracts are corrected. Upon completion of the 100% check, abstracts are submitted to a General Services Administration (GSA) keypunch facility for punching and verification.

A raw listing is made from the returned punched cards and the listing is compared with the abstract. A 10% check is performed at this stage, and if more than 10% of the rechecked card images are found to be in error, a more thorough check of the keypunched data is made to determine whether it would be more expeditious to edit the data, or resubmit the abstracts for keypunching. This procedure allows only punched decks containing fewer than approximately 1% keypunching mistakes to pass on to the next phase of quality control. Our experience has shown that accuracy of keypunching at GSA is either very good or very poor. We suspect this situation results from a keypunch machine occasionally being switched to an improper mode of operation during the verification process. The 10% check has in all cases detected these few "bad" data decks.

Computer Program Checks

The final stage of quality control relies on a comprehensive series of checks made on the raw data file by a computer quality control program (QCPI). There are two basic categories of checks: those which test conformity of data to format specifications and those which test relationships among variables for logical consistency and validity. Methodology for identification of tests is modeled after Naus (1973). When a test is made and fails, QCP1 lists the card image with diagnostics indicating which test has failed. This process of flagging errors allows POP personnel to reevaluate the information and determine the validity of data.

Tests for conformity of data to POP format codes and logic are categorized by QCPI as:

I. Class (Blanks) - ensures that fields designated as blank are in fact blank.

II. Class (Integer) - ensures that integer fields contain integers.

III. Interval (Integer) - range checks are performed on all integer variables.

IV. Codes (Alphanumeric) - alphanumeric variables are checked for validity of codes.

V. Existence - POP format logic requires some variables to always have a value, whereas other variables may remain blank. When a variable contains a value, we say it "exists". All variables which must exist are tested and, if found blank, are flagged (See page 9). A more sophisticated testing procedure also checks for the existence of dependent variables. Dependent variables must exist only when certain other independent variables exist. For instance, the variable "species" may or may not exist, but when it does exist, the number of animals seen must also exist.

VI. Relational - multivariate checks are made among variables, within and between card images. This test procedure is the most complicated to construct in that variable relationships which can be checked are often difficult to identify and not easily categorized. See "Tests Performed" for more detailed discussion (see page 13).

Error Diagnostics

The QCPI references variables by field number for test categories I, II, III, IV, and V. Table 3 provides field numbers associated with each variable on a data card image with brief variable descriptions. Table 2 provides examples of two card images and error diagnostics

TABLE 2.--Sample diagnostic listing from Quality Control Program run on dummy data demonstrating error messages for all classes of checks. Deck is equivalent to the POP Record and card number is the number of the POP card image within a record that failed a test. Level is the class of check that failed; check classes I through V are followed by the field numbers that failed (Table 3) and checks of class VI are followed by the relational check number (Table 7) that failed.

```
DECK NUMBER  1      CARD NUMBER 7
[LKJADFLKJKJKFUIOIUEUJKL5456546545654565456545654654                    ]
-------------------------------------------------------------------------
*   *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1       10        20        30        40        50        60        70        80
---------LEVEL----------   ------------VARIABLES OR TESTS WHICH FAILED----------

I    CLASS (BLANKS)         7,16

II   CLASS (INTEGER)        1,2,3,4,5,6,8,9,10,12

III  INTERVAL (INTEGER)     23

IV   CODES (ALPHANUMERIC)   11,15,17,18,22,24

V    EXISTENCE              (29,29), (30,30), (31,31)

DECK NUMBER 2          CARD NUMBER 2
[]76274760931          50000N122000W                    1003  0             ]
-------------------------------------------------------------------------
*   *    *    *    *    *    *    *    *    *    *    *    *    *    *    *
1       10        20        30        40        50        60        70        80
---------LEVEL--------    -------------VARIABLES OR TESTS WHICH FAILED----------

VI   Relational            [1]
```

as listed by QCPI. Since relational tests (Category VI below) utilize combinations of more than two variables from sometimes more than one card image, tests are numbered sequentially rather than naming each test by all variables associated with it.

Tests Performed

Category I - Class (Blanks) Fields 7 and 16 (see Table 3) are checked for nonblanks. Test failure occurs when characters occur in these fields.

Category II - Class (Integer) - Fields 1-6, 8-10, 12-14, 19-21, 23, and 25-32 are checked. Test failure occurs when noninteger characters are encountered, or when integer values contain imbedded blanks or when integer values are not right justified.

Category III - Interval (Integer) - the 24 fields listed under Category II are checked for minimum and maximum allowable integer values (Table 4). For integer fields such as behavior code where several intervals exist between the minimum and maximum values, a search technique called a binary string search is used to search for unacceptable values. Test failure occurs when range boundaries are exceeded.

Category IV - Codes (Alphanumeric) - Fields 11, 15, 17, 18, 22, and 24 are tested for the legality of characters. Test failure occurs when undefined codes are encountered (Table 5).

Category V - Existence - 24 tests involving two or more fields are made on 28 variables. Table 6 summarizes these tests. Test failure occurs when conditions of test as described in Table 6 are violated.

Category VI - Relational - 20 relational checks are made among variables. Table 7 lists these checks along with a brief description of the variables involved. Listed below are more complete descriptions for each test number:

1) Number of days in month incorrect.

A test is made to insure that the variable "DAY" has a value less than or equal to the number of days in that month listed on the same card image. See also test 8.

2) Number of animals sighted for species too large.

Based on our knowledge of natural history and stock sizes of some marine mammals, we can estimate the maximum number of animals one might expect to see for any given species. For example, a sighting of 500 sea lions is not unusual, but a sighting of 500 blue whales would clearly be questionable. Test failure occurs when number of animals exceed specified values (Table 8).

TABLE 3.--List of variable names on data card images with descriptions as used in POP[1/] format.

Variable Name	Field Number	Starting Column	Field Length	Variable Description
RID	1	(1)	6	Record identifier - integer
YR	2	(7)	2	Year - integer
MO	3	(9)	2	Month - integer
DAY	4	(11)	2	Day - integer
HR	5	(13)	2	Hour - integer
MIN	6	(15)	2	Minute - integer
	7	(17)	1	blank - treated as "variable" in quality control
LH	8	(18)	2	Latitude in degrees - integer
LM	9	(20)	2	Latitude in minutes - integer
LS	10	(22)	1	Latitude in tenths of minutes - integer
NS	11	(23)	1	Latitude hemisphere - alphanumeric
LLH	12	(24)	3	Longitude in degrees - integer
LLM	13	(27)	2	Longitude in minutes - integer
LLS	14	(29)	1	Longitude in tenths of minutes- integer
EW	15	(30)	1	Longitude hemisphere - alphanumeric
	16	(31)	1	blank
SPE	17	(32)	3	Species - alphanumeric
REL	18	(35)	1	Reliability of species identification - alphanumeric
CONF	19	(36)	1	Confidence interval - integer
NUM	20	(37)	4	Number of animals sighted - integer
GROUP	21	(41)	2	Group size - integer
IDIR	22	(43)	2	Direction animals swimming - alphanumeric
BEHAVE	23	(45)	2	Behavior of animal - integer
PS	24	(47)	1	Port/starboard side that animal was sighted on - alphanumeric
POINTS	25	(48)	1	Relative bearing (32 point circle) that animal was initially sighted at - integer

TABLE 3.--List of variable names on data card images with descriptions as used in POP[1] format.--continued.

Variable Name	Field Number	Starting Column	Field Length	Variable Description
IDIST	26	(49)	3	Initial sighting distance to animals in tens of meters - integer
VISI	27	(52)	1	Visibility - integer
WATER	28	(53)	3	Surface water temperature (°C) - integer
PTYPE	29	(56)	1	Platform type - integer
SID	30	(57)	3	Source identification - integer
TZ	31	(60)	3	Time zone - integer
FLAG	32	(63)	1	Flag designating beginning or ending of leg - integer
TEXT	33	(64)	17	Text or comments - alphanumeric

1/ Platforms of Opportunity Project.

TABLE 4.--Integer variables checked by the quality control program with acceptable range of values for each.

Variable Name	Field Number	Minimum Possible Value	Maximum Possible Value	Notes
RID	1	1		
YR	2	58	77	To present
MO	3	1	12	
DAY	4	1	31	Varies by month
HR	5	0	24	Military time (24 hour clock)
MIN	6	0	59	
LH	8	32	75	Where most POP vessels sail
LM	9	0	59	
LS	10	0	9	
LLH	12	110	180	Where most POP vessels sail
LLM	13	0	59	
LLS	14	0	9	
CONF	19	0	9	
NUM	20	0	9999	
GROUP	21	0	99	
BEHAVE	23	0	98	Not all inclusive values are possible. See Appendix Table 22.
POINTS	25	0	8	
IDIST	26	0	999	
VISI	27	1	6	
WATER	28	-4	26	
PTYPE	29	1	4	
SID	30	1	9999	Not all inclusive values are possible. See Appendix Table 26.
TZ	31	-12	12	
FLAG	32	0	2	

TABLE 5.--Alphanumeric variables and associated possible codes.

Variable Name	Field #	Code
NS	11	N, S
EW	15	E, W
SPE	17	See POP[1/] format code list for Species (SPE) (Appendix Table 21)
REL	18	T
IDIR	22	[2/] NΔ, SΔ, ΔE, ΔW, NE, NW, SE, SW
PS	24	P, S

1/ Platforms of Opportunity Project.
2/ Δ = blank

TABLE 6.--Relational existence checks performed on each sighting record are listed in vector form: (a, b,...c) where a the field number is treated as the independent variable and b....c are treated as dependent variables. This vector is read: Given a exists, b,...c must also exist. Vector (a,a) indicates a variable a cannot be blank. Checks are applied to each data card.

Test	Description
(1,1)	Record Identifier (RID) must exist.
(2,2)	Year (YR) must exist.
(3,3)	Month (MO) must exist.
(5,4)	Given Hour (HR), Day (DAY) must exist.
(6,4,5)	Given Minute (MIN), Hour (HR) and Day (DAY) must exist.
(8,8)	Latitude in Degrees (LH) must exist.
(10,9)	Given Latitude in tenths of a minute (LS), Latitude in Minutes (LM) must exist.
(11,11)	Latitude Hemisphere (NS) must exist.
(12,12)	Longitude in Degrees (LLH) must exist.
(14,13)	Given Longitude in tenths of a minute (LLM), Longitude in Minutes (LM) must exist.
(15,15)	Longitude Hemisphere (EW) must exist.
(17,20)	Given Species (SPE), Number (NUM) must exist.
(18,17)	Given Reliability (REL), Species (SPE) must exist.
(19,17)	Given Confidence Interval (CONF), Species (SPE) must exist.
(21,17)	Given Group Size (GROUP), Species (SPE) must exist.
(22,17)	Given Direction Headed (IDIR), Species (SPE) must exist.
(23,17)	Given Animal Behavior (BEHAVE), Species (SPE) must exist.
(24,17)	Given animal seen on port or starboard (PS), Species (SPE) must exist.
(25,17)	Given Points (POINTS) to port or starboard, Species (SPE) must exist.
(26,17)	Given Initial Sighting Distance (IDIST), Species (SPE) must exist.
(29,29)	Platform Type (PTYPE) must exist.
(30,30)	Source Identification (SID) must exist.

TABLE 6.--Relational existence checks performed on each sighting record are listed in vector form: (a, b....c) where a the field number is treated as the independent variable and b....c are treated as dependent variables. This vector is read: Given a exists, b,...c must also exist. Vector (a,a) indicates a variable a cannot be blank. Checks are applied to each data card.--continued

Test	Description
(31,31)	Time Zone (TZ) must exist.
(32,4,5,6, 8,9,12,13)	Given Flag (FLAG), Day (DAY), Hour (HR), Minute (MIN), Latitude Degrees (LH), Latitude Minutes (LM), Longitude Degrees (LLH), and Longitude Minutes (LLM) must exist.

TABLE 7.--Relational checks performed by the quality control program. Check numbers in brackets refer to QCP1 output diagnostic.

Check Number	Field Numbers Involved	Description
[1]	2,3	Number of days in month incorrect.
[2]	17,20	Number of animals sighted for species is too high.
[3]	17,21	Group size too large.
[4]	17,23	Behavior code incompatible with species.
[5]	19,20	Confidence interval indicates a range larger than half the total animals seen.
[6]	20,21	Group size exceeded total animals seen.
[7]	23,26	Initial sighting distance incompatible with behavior code.
[8]	2,3,4	Number of days in February on a leap year incorrect.
[9]	8,12,17	Area in which species was sighted not normal for that species or sighting occurred outside the normal bounds of the study area.
[10]	2,3,4,5,6	Time out of sequence.
[11]	8,9,10,11,12,13,14, 15	Distance of transit exceeded 300 nautical miles.
[12]	2,3,4,5,6,8,9,10 11,12,13,14,15	Vessel speed during a transit exceeded 20 knots.
[13]	2,3,4,5,6,8,9,11 12,13,15	Number of continuous observation hours exceeded 15.
[14]	2,3,4,5,6,8, 11,12,15	Transit occurred during darkness.
[15]	17	Species is rare.
[16[	32	Transit beginning and ending flags not in proper order.
[17]	1,2,3,4	Record Identifier on data cards incorrect or inconsistent with starting date of record.
[18]	31	Time Zone changed by more than two on adjacent data cards.

TABLE 7.--Relational checks performed by the quality control program. Check numbers in brackets refer to QCP1 output diagnostic.--continued

Check Number	Field Numbers Involved	Description
[19]	8,12,28	Water temperature has exceeded value allowed for this latitude.
[20]	2,3,4,5,6,8,9,10, 11,12,13,14,15,32	Beginning and ending times of transit are the same, or the positions are the same.

3) Group size too large.

Based upon our knowledge of natural history of some marine mammals, we can predict group sizes, i.e., a number of animals in close association with each other. Table 8 lists the maximum allowable values before test failure occurs.

4) Behavior code incompatible with species.

As each species is encountered by QCP1, a check is made to determine whether or not the indicated behavior is possible. For example, gray whales do not haul out on ice. If such a combination of species and behavior code were detected, test failure would result. Table 9 lists incompatible behavior codes for each species.

5) Confidence interval indicates a range larger than half the total animals seen.

By our definitions, the lower range boundary of the confidence interval cannot be less than zero, and the upper range boundary cannot exceed half the total. Test failure occurs when range boundaries are exceeded.

6) Group size exceeded total animals seen.

Test failure occurs when the variable group size exceeds the variable number.

7) Initial sighting distance incompatible with behavior code.

This relational check compares behavior codes with initial sighting distance (i.e., distance from observer to animal when the animal was first seen). For example, behavior code 2 represents an animal which was sleeping, perhaps a sea lion sleeping on rocks, and the initial allowable sighting distance is 500 meters. If the indicated initial sighting distance for behavior code 2 exceeds 500 meters, the test would fail and the case would be rechecked with raw data sheets for verification or rejection of the data. See Table 10 for range boundaries of initial sighting distances as it relates to behavior code.

8) Number of days in February on a leap year incorrect.

This test is made separately from test 1, for two reasons: program efficiency and the test involves 3 variables whereas test 1 involves two variables. Test failure occurs when day exceeds 29 during February on leap years.

TABLE 8.--Range of allowable value states of number (NUM), group size (GROUP), latitude (LH) and longitude (LLH) for each species. Values exceeding range boundaries are flagged by the quality control program (QCP1) for verification by researcher.

Species code	Number of animals		Group size		[1/] Latitude		[2/] Longitude	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
BE	1	15	1	15	32	60	110	180
DL	1	300	1	50	58	75	110	180
MS	1	3	1	3	42	65	110	180
MM	1	20	1	20	65	75	110	180
OO	1	25	1	25	32	75	110	180
SL	1	2000	1	2000	32	25	110	180
TT	1	500	1	500	32	35	110	180
SG	1	2000	1	2000	32	30	110	180
SA	1	2000	1	2000	32	30	110	180
SC	1	2000	1	2000	32	30	110	180
PP	1	20	1	20	32	65	110	180
PD	1	50	1	20	32	65	115	180
LO	1	1000	1	1000	32	62	110	180
LH	1	2000	1	2000	32	30	110	180
ZX	1	25	1	25	32	65	110	180
LB	1	2000	1	2000	32	60	115	180
PM	1	100	1	100	32	60	110	180
GG	1	1000	1	25	32	61	110	180
PC	1	100	1	100	32	50	110	180
DD	1	2000	1	2000	32	50	110	180
GM	1	500	1	500	32	50	110	180
BM	1	6	1	6	55	75	110	180
BL	1	10	1	4	32	60	110	180
BP	1	50	1	15	32	61	110	180
BB	1	50	1	20	32	61	110	180
BX	1	50	1	20	32	50	110	180
BA	1	10	1	4	32	65	110	180
MN	1	100	1	25	32	61	110	180
ER	1	200	1	200	32	75	110	180
BG	1	10	1	10	32	65	110	180

TABLE 8.--Range of allowable value states of number (NUM), group size (GROUP), latitutde (LH) and longitude (LLH) for each species. Values exceeding range boundaries are flagged by the quality control program (QCP1) for verification by researcher.--continued

Species code	Number of animals		Group size		Latitude		Longitude	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
UZ	1	200	1	200	32	75	110	180
UX	1	2000	1	2000	32	75	110	180
UD	1	2000	1	2000	32	75	110	180
UW	1	2000	1	2000	32	75	110	180
UM	1	30	1	5	60	75	110	180
EL	1	300	1	150	32	61	115	180
CU	1	8000	1	1000	32	62	110	180
EB	1	25	1	25	50	75	110	180
EJ	1	8000	1	1000	32	65	115	180
OR	1	2000	1	2000	55	75	135	180
PF	1	100	1	10	50	75	110	180
PH	1	25	1	25	55	75	110	180
PV	1	1500	1	1500	30	75	115	180
PL	1	100	1	100	55	75	110	180
ZC	1	1000	1	1000	32	51	110	180
MA	1	100	1	100	32	60	110	180
UP	1	2000	1	2000	32	75	110	180
US	1	1500	1	1500	32	75	110	180
UO	1	8000	1	1000	32	65	115	180
SB	1	2000	1	2000	0	30	100	160E
FA	1	10	1	10	0	30	10C	100E

1/ Latitudes are all northern hemisphere.

2/ Longitudes are western hemisphere unless otherwise specified.

TABLE 9.--List of behavior codes (BEH) by species (SPE) which are flagged by the quality control program for re-inspection. Codes listed below are based on current knowledge of natural history and known behaviors.

Species code	1/ Improbable or impossible behavior codes
BE	08-11, 24, 25, 31-39, >41
DL	08-11, 24, 25, 31-39, >41
MS	08-11, 24, 25, 31-39, >41
MM	08-11, 24, 25, 31-39, >41
OO	08-09, 31-39, >41
SL	28-39, >41
TT	28-39, >41
SG	28-39, >41
SA	28-39, >41
SC	28-39, >41
PP	10, 11, 24, 25, 28-39, >41
PD	28-39, >41
LO	28-39, >41
LH	28-39, >41
ZX	08-11, 24, 25, 31-39, >41
LB	10, 11, 24, 25, 28-39, >41
PM	08-11, 24, 25, 31-39, >41
GG	08, 10, 11, 24, 25, 28-39, >41
PC	08, 10, 24, 25, 28-39, >41
DD	11, 28-39, >41
GM	08, 11, 31-39, >41
BM	08-11, 31-39, >41
BL	08-11, 31-39, >41
BP	08-11, 31-39, >41
BB	08-11, 31-39, >41
BX	08-11, 31-39, >41
BA	08-11, 31-39, >41
MN	08-11, 31-39 >41
ER	08-11, 31-39, >41
BG	08-11. 31-39. >41

TABLE 9.--List of behavior codes (BEH) by species (SPE) which are flagged by the quality control program for re-inspection. Codes listed below are based on current knowledge of natural history and known behaviors.--continued.

Species code	1/ Improbable or impossible behavior codes
UZ	08-11, 31-39, >41
UX	31-39, >41
UD	31-39, >41
UW	31-39, >41
UM	02, 03, 08-12, 15, 19-26, 28-30, 78
EL	08, 09, 28-30, >41
CU	08, 28-30, 63
EB	08, 09, 10, 11, 28-30
EJ	08, 09, 28-30
OR	08-11, 28-30
PF	08-11, 28-39
PH	08-11, 28-39
PV	08-11, 24-26, 28-30
PL	08-11, 24-26, 28-39
ZC	08, 09, 28-30
MA	08, 09, 28-30
UP	08, 09, 28-30
US	08, 09, 28-30
UO	08, 09, 28-30
SB	11,28-39, >41
FA	10, 11, 24, 25, 28-39, >41

1/ See Appendix for behavior code definitions.

TABLE 10.--Minimum and maximum initial sighting distances (in meters) that can be associated with observed behaviors.

Behavior code 1/	Initial sighting distances		Behavior code	Initial sighting distances	
	Minimum allowable	Maximum allowable		Minimum allowable	Maximum allowable
01	0	9999	31	0	500
02	0	500	32	0	80
03	0	200	33	0	200
04	0	150	34	0	100
05	0	300	35	0	200
06	0	300	36	0	200
07	0	300	37	0	100
08	0	10	38	0	150
09	0	1500	39	0	300
10	0	100	40	0	300
11	0	100	61	0	300
12	0	500	62	0	80
13	0	300	63	0	200
14	0	300	64	0	100
15	0	300	65	0	100
16	0	300	66	0	200
17	0	300	67	0	150
18	0	300	68	0	300
19	0	100	69	0	50
20	0	50	71	50	300
21	0	50	72	50	500
22	0	100	73	50	300
23	0	50	74	40	300
24	0	100	75	30	300
25	0	100	76	0	500
26	0	500	77	0	500
27	0	300	78	0	500
28	0	500	79	0	300
29	20	500	80	0	300
30	50	500	81	50	200

1/ See Appendix for behavior code definitions.

9) Area in which species was sighted not normal for that species or sighting occurred outside normal bounds of study area.

Based on knowledge of gross geographic distribution of each species, and on knowledge of where most ships sail that contribute data to POP, minimum and maximum latitudes and longitudes have been definied where species are likely to be sighted. If these boundaries which vary by species are exceeded, test failure occurs. As an example, if beluga whales which live in Alaskan waters were sighted off the coast of Washington, QCPI would flag the sighting (see Table 8).

10) Time out of sequence.

Time must be in chronological order throughout each record. If time is not in chronological order, test failure occurs.

11) Distance of transit exceeded 300 nautical miles.

Occasionally, data is received which documents ship time and position at intervals during which some watch effort is expended. This information can be treated as transit data, whereby watch effort can be evaluated with ship position to obtain some index to animal density. We have arbitrarily allowed transit lengths to be less than or equal to 300 nautical miles in length (equivalent to 20 knots for 15 hours) before test failure occurs.

12) Speed of ship exceeded 20 knots.

Ship speed is calculated, based upon the beginning and ending of transits. When ship speed exceeds 20 knots, the end of transit card image is flagged.

13) Number of continuous hours of observation exceeded 15.

Any transit that encompasses a time period exceeding 15 hours in duration is flagged.

14) Transit occurred during darkness.

The beginning and ending time of each transit is checked against computed sunrise and sunset times to verify that transits occurred during daylight hours. Sightings at night while on transits indicate possible errors in data. Note that some nighttime sightings have been received from commercial fishermen who have observed sea lions within range of flood lights during fishing operations. These sightings, however, were made during nontransit-type operations.

The time (Greenwich Mean Time) of sunrise and sunset is computed according to the following[1/]:

Sunrise is computed from

$$S = [\theta_o - \cos^{-1}(-\tan\phi_s \tan\phi_o)]/15 - E + 12,$$

where

θ_o = observer's longitude
ϕ_o = observer's latitude
ϕ_s = subsolar latitude (declination of sun)
E = equation of time

ϕ_s and E are approximated by

$$\phi_s \doteq 23.5 \cos(t + 10)$$
$$E \doteq 0.123 \cos(t + 87) - 1/6 \sin(2t + 20)$$
$$t \doteq 0.988(D - 1 + 30.3(m - 1)),$$

where D and m are day and month, respectively.

Sunset is computed from

$$S = [\theta_o + \cos^{-1}(-\tan\phi_s \tan\phi_o)]/15 - E + 12,$$

where

θ_o = observer's longitude
ϕ_o = observer's latitude
ϕ_s = subsolar latitude (declination of sun)
E = equation of time

ϕ_s and E are approximated by

$$\phi_s \doteq -23.5 \cos(t + 10)$$
$$E \doteq 0.123 \cos(t + 87) - 1/6 \sin(2t + 20)$$
$$t \doteq 0.988(D - 1 + 30.3(m - 1)),$$

where D and m are day and month, respectively.

15) Species sighted is rare.

Strictly speaking, this is not a relational test because only one variable, species, is tested. The test, however, does not fit well into any other categories and, therefore, is listed here as a relational check. Test failure occurs when any species which is rarely seen (Table 11) occurs on a sighting card.

1/ Hewlett Packard HP-97 Users Library, Avigation.

TABLE 11.--List of Species (SPE) which are rarely seen on marine mammal surveys. These values are flagged by the quality control program for verification by researcher.

Species code	Species	
	Scientific name	Common name
BE	Berardius bairdii	North Pacific giant bottlenose whale
MS	Mesoplodon stejnegeri	Sabertooth whale, Bering Sea beaked whale
MM	Monodon monoceros	Narwhal
ZX	Ziphius cavirostris	Goosebeak whale
BL	Balaenoptera musculus	Blue whale
BG	Balaena glacialis	Right whale
FA	Feresa attenuata	Pygmy killer whale

16) Transit beginning and ending flags not in proper order.

The variable, Flag, can receive the values of "1" for the beginning of a transit, or "2" for the end of a transit. The value of "1" must always be followed at some later time by a value of "2". A "1" cannot be followed by a "1" and a "2" cannot be followed by a "2". Test failure occurs whenever the above logic is violated.

17) Record I.D. (RID) on a data card incorrect or inconsistent with starting date of record.

The variable, RID, defined in POP format instructions (Appendix, page 52) is calculatable from the date provided on the first data card of the Record. This value not only should agree with the starting date of the cruise, but also should be the same on every card image of the record.

18) Time zone value changed by more than "2" on adjacent data cards.

Vessels very rarely change clock settings by more than two time zones in any given day. If such a change occurs, then it is flagged by QCP1 for inspection.

19) Water temperature has exceeded allowable value for latitude on card image.

Surface water temperature varies roughly by latitude. Upper limit expected temperatures for several ranges of latitudes have been assigned for this test. If the temperature on a data card exceeds that allowed for the latitude, the card image is flagged.

20) Beginning and ending times of transit are the same or the positions are the same.

A transit must span a period of time or length of trackline. If it does not, the second card (Flag = 2) of the transit pair is flagged.

Mapping and Quality Control

A computer drawn map is made of positions after all data have been completely processed by QCP1, and edited by POP personnel. A visual scan is made for any points occurring on land. Points occurring on land are checked against raw data and values are either corrected to match the raw data, or rejected completely if no discrepancy occurs. Note that each card image containing bad positions is removed from the data set.

Transmission of Data to OCSEAP

Data from the Gulf of Alaska and Bering Sea are transmitted through the Juneau OCSEAP Office to the Environmental Data Service (EDS) in partial fulfillment of RU-68 contractual obligations. Data are processed and analyzed at the Marine Mammal Division in the POP format (see Appendix); translation of data to the OCSEAP 027 format is the final step in preparing it for submission to the EDS.

A POP card image or "CI" (see Page 7) consists of essentially one 80 column format that documents a single sighting or event at one time and position. Transit data can be documented using a pair of data card images marked with first a "1" in the Flag field (column 63) and then a "2" to indicate the beginning and end, respectively, of a transit. All POP card images are ordered chronologically to reflect as accurately as possible recorded events in the order that they actually occurred. A POP transit consists of a period of time during which a vessel travelled a straight line course at a steady speed with an observer (may be part of bridge watch) watching for and recording sightings of marine mammals.

Translation of information from the POP format to the OCSEAP 027 format is facilitated, in part, by using codes identical to those of the OCSEAP 027 format (Tables 13-19). When codes are not identical, some translation must be done to convert the POP data to 027 formats. In some cases, 027 variables are derived from the POP file by using more than one POP variable or, sometimes, more than one card image (e.g., the 027 variable "Platform Direction" is obtained by using the beginning and end position from a pair of POP transit "Flagged" card images and is computed in degrees true from the beginning to the ending position.)

The following tables have been prepared to demonstrate more precisely how information is translated from the POP format to the OCSEAP 027 format. Table 12 lists all variables in the POP format and indicates which 027 Record Types contain the same or derived information. Note a difference in terminology: the 027 format"record"refers to a single card image, whereas POP"record"refers to a set of card images attributable to the same data source. Variables in the 027 format which have no POP equivalent are left blank during translation and do not appear in the following tables. Tables 13 through 19 list only the variables of each 027 Record Type that are derived from the POP format and include an explanation of the derivation of each.

TABLE 12.--List of Platforms of Opportunity Project Variables and their location by Record Type in the 027 Format.

POP Format		027 Format						
Columns	Variable	Record Type[1/] 1	2	3	4	5	6	7
1- 6	Record ID	✓	✓	✓	✓	✓	✓	✓
7-12	Year, Month, Day	✓	✓	✓	✓			
13-16	Time	✓	✓	✓	✓			
18-30	Latitude and Longitude	✓	✓	✓	✓			
32-34	Species					✓		
35	Species ID Reliability						✓	
36	Number Confidence Interval					✓		
37-40	Number of Animals					✓		
41-42	Group Size				✓			
43-44	Direction Headed				✓			
45-46	Behavior Code					✓		
47-48	Port/Stbd & Points				no 027 equivalent			
49-51	Initial Distance				✓			
52	Visibility Code			✓				
53-55	Water Surface Temp. °C			✓				
56	Platform Type		✓					
57-59	Source ID		✓					
60-62	Time Zone	converted to Greenwich Mean Time (GMT)						
63	Transit Flags[2/]	✓	✓		✓			
64-80	Text							✓

1/ No equivalent information exists in the POP format for 027 record type 8, consequently, this Record Type is not used.

2/ This information is computed from beginning and end of transit (FLAG = 1, FLAG = 2) cards.

TABLE 13.--OCSEAP[1] 027 Record Type 1 (Location) format and derivation from POP format. The OCSEAP 027 Record Type 1 (location card) format contains transit information. Derivation of this 027 Record Type requires information from a pair of POP[2] transit flagged (1 and 2 in column 63) card images. If no transit information exists in the POP format, then this card will not be produced during translation from POP to 027.

027 Record Type 1		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027
File Identifier	4-9	Identical to POP Record ID
Record Type	10	Always 1
Flight/Station Number	11-20	Numbered 1 thru N for each POP transit or for each series of sightings reported while not on transits. If no transit cards exist in the POP File (Flag 1 or 2 in Column 63) then entire file is treated as a single station. Refer to transit "FLAG" explanation in the Appendix.
Sequence Number	21-24	1 thru N for N card images within a single POP record.
Starting Date-Time	25-34	This information is taken from the beginning transit card (FLAG = 1) in a POP transit series.
Year	25-26)	This information is taken from
Month	27-28)	the equivalent fields in the
Day	29-30)	POP format but is converted to
Hour	31-32)	Greenwich Mean Time using POP
Minute	33-34)	Time zone information from columns 60-62.
Starting Position	35-49	This position copied from POP (FLAG = 1) card.
Latitude		
Degrees	35-36	Copied from POP LH field.
Minutes	37-38	Copied from POP LM field.
Seconds	39-40	POP LS field (tenths of minutes) converted to seconds (LS x 6). Left blank if blank on POP card.
Hemisphere	41	Copied from POP NS field.

TABLE 13.--OCSEAP[1/] 027 Record Type 1 (Location) format and derivation from POP format. The OCSEAP 027 Record Type 1 (location card) format contains transit information. Derivation of this 027 Record Type requires information from a pair of POP[2/] transit flagged (1 and 2 in column 63) card images. If no transit information exists in the POP format, then this card will not be produced during translation from POP to 027.--continued.

027 Record Type 1		
Name of field	Columns	Derivation from POP format
Longitude		
Degrees	42-44	Copied from POP LLH field.
Minutes	45-46	Copied from POP LLM field.
Seconds	47-48	POP LLS field (tenths of minutes converted to seconds (LLS x 6)
Hemisphere	49	Copied from POP EW field.
Elapsed Time	50-53	The HR, MIN field from the POP (FLAG = 1) card is subtracted from the equivalent field on the following POP (FLAG = 2) card.
Distance Along Track	54-58	The rhumb line distance D in nautical miles between the POP (FLAG = 1) and (FLAG = 2) card positions is computed and placed in this field.
Ending Position	60-75	This is the position information from the POP (FLAG = 2) card that is associated with the (FLAG = 1) card used for beginning position.
Latitude		
Degrees	60-61	Copied from POP LH field.
Minutes	62-63	Copied from POP LM field.
Seconds	64-65	POP LS field (tenths of minutes) converted to seconds (LS x 6)
Hemisphere	66	Copied from POP NS field.
Ending Longitude		
Degrees	67-69	Copied from POP (FLAG = 2) LLH field.
Minutes	70-71	Copied from POP (FLAG = 2) LLM field.
Seconds	72-73	POP LLS (tenths of minutes field converted to seconds (LLS x 6).
Hemisphere	74	Copied from POP (FLAG = 2) EW field.

1/ Outer Continental Shelf Environmental Assessment Program.
2/ Platforms of Opportunity Project

TABLE 14.--OCSEAP[1/] "027" Record Type 2 (Environmental 1) format and derivation from the POP[2/] format. This Record type is used to provide Platform Type and Source Identification codes. When transit information exists within POP records, a Record Type 2 occurs for each transit, with Platform Direction (course made good) and speed made good indicated.

027 Record Type 2		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027
File Identifier	4-9	Identical to POP Record Identifier
Record Type	10	Always 2
Flight/Station Number	11-20	Same derivation as for Record Type 1
Sequence Number	21-24	Same derivation as for Record Type 1
Sighting Date & Time	25-34	This information is taken from the equivalent POP fields and converted to GMT. Day and time fields will be left blank if found blank in corresponding POP fields.
Sighting Latitude and Longitude	35-49	Same derivation as for Record Type 1.
Platform Type Code	50	Translated to 027 equivalent from POP. See Appendix Table 25. POP → 027 1 2 2 5 3 G 4 F
Platform ID Code	51-53	Copied from POP (Appendix Table 26) Source ID Code.
Platform Direction	54-56	Computed from POP Transit Data if available.
Air Speed	61-63	Computed from POP Transit Data if available.

1/ Outer Continental Shelf Environmental Assessment Program.
2/ Platforms of Opportunity Project.

TABLE 15.--OCSEAP[1/] 027 Record Type 3 (Environmental 2) format and derivation from POP[2/] format. Record Type 3 receives Water Surface Temperature (°C) and Surface Visibility (Appendix) from the POP format. Whenever one of these variables change value, a new Environmental 2 record will be produced with the Time, Date, Latitude and Longitude of the change taken from the appropriate POP card image.

027 Record Type 3		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027
File Identifier	4-9	Copied from POP Record ID
Record Type	10	Always 3
Flight/Station Number	11-20	Same derivation as for Record Type 1.
Sequence Number	21-24	Same derivation as for Record Type 1.
Date, Time	25-34	Copied from same POP card image accompanying environmental data but converted to GMT.
Latitude and Longitude	35-49	Same derivation as for Record Type 1.
Water Surface Temperature (C°)	64-67	Taken from POP water temperature which is only accurate to whole degrees Celsius and does not include tenths of a degree, consequently, the 027 tenths column is set to zero in all cases.
Surface Visibility	70	Copied from POP VISI Field.

1/ Outer Continental Shelf Environmental Assessment Program.
2/ Platforms of Opportunity Project.

TABLE 16.--OCSEAP[1]/ 027 Record Type 4 (Sighting 1) format and derivation from POP[2]/ format. Record Type 4 receives information pertaining to an actual marine mammal sighting. Distance Surveyed (Columns 50-55) is computed from POP transit flagged cards when available.

027 Record Type 4		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027.
File Identifier	4-9	Copied from POP Record ID (Columns 1-6)
Record Type	10	Always 4
Flight/Station Number	11-20	Same derivation as for Record Type 1.
Sequence Number	21-24	Same derivation as for Record Type 1.
Date, Time	25-34	Taken from same POP card image as accompanying sighting data but converted to GMT.
Latitude & Longitude	35-49	Same derivation as for Record Type 1.
Distance Surveyed	50-55	Distance in kilometers to hundredths computed between POP FLAG = 1 and FLAG = 2 cards.
Group Size	65-67	Copied directly from POP equivalent (Colums 41-42).
Animal Movement Direction	68-70	Taken from POP equivalent field (Columns 43-44) and converted to whole degrees True (e.g. NE→"045").
Unit Code for Sighting Distance	71	The initial sighting distance field (IDIST) in POP format is always in tens of meters (up to 9999). Since 027 format allows only values up to 999; distances exceeding 999 meters in POP format are converted to miles and tenths. 027 unit code "1" indicates distance has been copied in meters, and unit code "Ø" indicates distance has been translated to miles and tenths.

TABLE 16.--OCSEAP[1/] 027 Record Type 4 (Sighting 1) format and derivation from POP[2/] format. Record Type 4 receives information pertaining to an actual marine mammal sighting. Distance surveyed (Columns 50-55) is computed from POP transit flagged cards.--continued.

027 Record Type 4		
Name of field	Columns	Derivation from POP format
Distance from Platform	72-74	Converted directly from IDIST (Columns 49-51) or converted to nautical miles and tenths if greater than 9990 meters.
Bearing to Animals	75-77	Calculated from POP relative bearing in points when sightings occur along transects. Heading of ship is azimuth in degrees true from the beginning to ending transit positions.
Platform Heading	78-80	Same as that received by 027 Record Type 2.

1/ Outer Continental Shelf Environmental Assessment Program

2/ Platforms of Opportunity Project

TABLE 17.--OCSEAP[1] 027 Record Type 5 (Sighting 2) format and derivation from POP[2] format. Record Type 5 contains sighting data contained in the POP format. The POP format contains only one "number of Animals" field which becomes "Number of Individuals" in the 027 format. No information regarding number of adults or immatures is recorded on the POP format. POP codes UD & UW translate to 8912019901 and 8999999901 respectively. POP Codes for unidentified small whales 'UX' and unidentified large whales 'UZ' have no 027 code equivalents and, consequently, are not translated to the 027 format for submission to EDS.

027 Record Type 5		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027
File Identifier	4-9	Copied from POP Record ID
Record Type	10	Always 5
Flight/Station Number	11-20	Same derivation as for 027 Record Type 1.
Sequence Number	21-24	Same derivation as for 027 Record Type 1.
Taxonomic Code	25-34	POP Species Code (Columns 32-34) translated to 027 Code for species of same scientific name (see Appendix)
Subspecies Code	35-36	No POP equivalent
Behavior Code	37-38	Copied directly from POP equivalent (Columns 45-46)
Confidence Code	39	Applies to Number of Animals reported. Copied directly from POP equivalent (Column 36)
Number of Individuals	40-44	Copied directly from POP Number of animals field (Columns 37-40)

1/ Outer Continental Shelf Environmental Assessment Program.
2/ Platforms of Opportunity Project.

TABLE 18.--OCSEAP[1/] 027 Record Type 6 (Sighting 3) format and derivation from POP[2/] format. Record Type 6 contains one type of information from the POP sighting record which is the species identification Reliability Code.

027 Record Type 6		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027.
File Identifier	4-9	Copied from POP Record ID (Columns 1-6)
Record Type	10	Always 6
Flight/Station Number	11-20	Same derivation as for 027 Record Type 1.
Sequence Number	21-24	Same derivation as for 027 Record Type 1.
Identification Reliability	35	Translated from POP Reliability Code (column 35) POP 027 T = Ø Blank = 2 No equivalent = 1

1/ Outer Continental Shelf Environmental Assessment Program.
2/ Platforms of Opportunity Project.

TABLE 19.--OCSEAP[1/] 027 Record Type 7 (Text) format and derivation from POP[2/] format. Record Type 7 contains text from the POP Text field (Columns 64-80) and is kept in proper sequence by the Sequence Number field.

027 Record Type 7		
Name of field	Columns	Derivation from POP format
File Type	1-3	Always 027
File Identifier	4-9	Copied from POP Record ID (Columns 1-6)
Record Type	10	Always 7
Flight/Station Number	11-20	Same derivation as for 027 Record Type 1
Sequence Number	21-24	Same derivation as for 027 Record Type 1
Text	25-80	Copied directly from POP Text Field (Columns 64-80)

1/ Outer Continental Shelf Environmental Assessment Program.
2/ Platforms of Opportunity Program.

DISCUSSION

The Platforms of Opportunity Project solicits marine mammal sighting reports from a wide variety of observers. Some observers contribute data because of a personal interest in marine mammals, and others do so because of official directives from their parent organization. Although all reasonable efforts have been made to carefully screen the data before it is coded for computer archival, some invalid card images may exist within the POP computer file.

All checks made on the data are outlined in this paper, and any card images containing data that fell outside of stated accept ability ranges were at least double checked with the raw field logs and have been deemed to be valid. Very few sighting reports, however, can be absolutely confirmed as valid by either clear accompanying photographs or through the testimony of expert marine mammal biologists present when sightings were made. Reports of species outside of their normal range, when accompanied by descriptive notes, have been included in the computer file so that similar reports by other observers in the same area might be detected. Similar reports by independent observers might lend credence to such reports. The minimum requirement for positioning accuracy is whole degrees latitude and longitude which translates roughly to plus or minus 30 nautical miles. Most positions, however, are probably accurate to within plus or minus five nautical miles. Optional information such as behavior, surface water temperature, etc., is valid where entered.

It is the opinion of the authors that the majority of POP data that has been passed for computer archival and transmitted to the National Oceanographic Data Center (NODC) are valid to the extent of providing supporting evidence for determination of range, temporal distribution, and certain behavioral characteristics of marine mammals that occur in the North Pacific Ocean. Also, the quality of information received from observers improves over time as each observer gains experience in identifying marine mammals. As a result, the overall quality of POP data has improved since the project's inception, and data from 1976-78 are considered more reliable than those collected earlier.

The primary value of this data base is for determination of general distribution and seasonality of marine mammals. Copies of raw field data for unique reports such as rare animals or those outside of their normal range can be obtained from the POP office, Marine Mammal Division, Northwest and Alaska Fisheries Center, 7600 Sand Point Way, N.E., Seattle, Washington 98115.

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Special thanks must be given to the many participating observers and agencies without whom a program of this type would not be possible.

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Data Coding

General guidelines and symbols for following instructions:

(1) All values entered into variable fields must be right justified, unless specified otherwise.

(2) Use all capitals for coding.

(3) Δ = blank space; do not write anything.

(4) " " = print exactly what is written between quotation marks.

(5) zeros (0) placed to the left of values in variable fields are not required (e.g., for time: 0945 = Δ945).

(6) If information regarding some variable is not given, leave the field blank.

(7) Use standard abbreviations in comments as listed in Table 1.

(8) Time must occur in chronological sequence.

(9) If you are new, and are going to log data for the first time, there are three information sources which you must study before you begin logging. First, browse through these instructions; second, look at the examples of how raw data sheets are coded; and third, read the sections on File Logic and Quality Control. After having overviewed these sources, reread these coding instructions and then you may start logging data. Please refer to these sources whenever you have a question. If you can't find the answer, make a note of your question and ask the POP officer your question.

PLEASE BE EXTREMELY CAREFUL WHEN LOGGING DATA. THE FASTEST WAY TO GET OUR WORK DONE IS TO DO IT CORRECTLY THE FIRST TIME.

APPENDIX TABLE 20.--List of standard abbreviations used in Platforms of Opportunity Program (POP) format, comments field (columns 64-80).

Abbreviation	Description
AERIAL	Describes data collected from aerial survey
AK	Alaska
ALEUTIANS	Data collected near Aleutian Islands
BERING	Bering Sea
CANADA	Indicates waters near western Canadian coastline
CHARTERS	Charter boats, sport fishing and otherwise
CHUKCHI	Chukchi Sea
E	East
EQ	Equatorial
GOA	Gulf of Alaska, typically away from the coast or northern Gulf of Alaska
LCI	Lower Cook Inlet
MISCELLANEOUS DATA	Enter in lieu of source and platform on file header to indicate that data as received cannot be ascribed to source or platform. This data will be held in the raw data files under "miscellaneous," sufficient information should be supplied in the comments field when this designation is used to permit positive assessment of the raw data record.
MMD	Marine Mammal Division
MR.	Mister. Used when identifying contributor of data as a male person rather than as an organization.
MS.	Same as above, only for females.
N; NE; NW	North; northeast; northwest
NOAA	National Oceanic and Atmospheric Administration
PWS	Prince William Sound
S; SE; SW	South, southeast; southwest
UNID	Typically used on Record ID card to describe unidentified persons or vessels which are a member of some identifiable group (e.g. Unid Troller = source of data was a member of the Alaska Trollers' Association which, as an organization, contributes data to POP). Records thus categorized should not contain any transit information to preclude the possibility of pairing the beginning and the end transit cases for different vessels.

APPENDIX TABLE 20.--List of standard abbreviations used in Platforms of Opportunity Program (POP) format, comments field (columns 64-80.--Continued

Abbreviations	Description
UNK	Typically used on File Header to describe platforms (vessels) or species that cannot be identified.
USCG	United States Coast Guard
W	West
W COAST	Pacific Ocean waters off of Washington, Oregon and California

There are two types of card images in the POP file, the Record ID card or ID card and the data or sighting card.

Instructions for filling out the Record ID Card

The Record ID Card is used once and only once at the beginning of each Record.

Columns	Variable Name	Definition and Remarks
1- 4	-	"RU68" - OCSEAP Research Unit number
5		Δ
6-11	RID	Record Identifier is a unique descriptor for each record (cruise or data set), and has been arbitrarily defined as follows: Column 6 is used to sequence records which may have otherwise identical record ID's (e.g. 175168 equates to the First "1" cruise received by POP which provided marine mammal sighting data as early as the "168"th Julian Day in year 1975 "75". Up to nine unique RID's can be assigned for a single Julian Day).
12		Δ
13	EN	"E" if data is earmarked for sending to EDS - Environmental Data Service. These data include all OCSEAP funded work. "N" if data will not be transmitted to EDS.
14-16		ΔΔΔ
17-19	BEGMO	Three digit alphanumeric abbreviation for beginning month of data set, i.e., the alphanumeric equivalent of month as specified numerically on the first sighting card image of the Record. Use the following abbreviations for BEGMO: JAN,FEB,MAR,APR,MAY,JUN,JUL,AUG,SEP, OCT,NOV,DEC.

Column	Variable	Definition and Remarks
20		Δ
21-22	BEGDAY	Beginning day of beginning month of Record, i.e. DAY as specified on first sighting card image of Record.
23-24		ΔΔ
25-27	ENDMO	Three digit alphanumeric abbreviation for ending month of Record, i.e. the alphanumeric equivalent of month as specified numerically on the last sighting card image of the Record. See BEGMO for abbreviations.
28		Δ
29-30	ENDDAY	Ending day of ending month of Record, i.e. DAY as specified on last sighting card image of Record.
31-33		ΔΔΔ
34-37	YEAR	Beginning year of Record. Note that Records seldom contain information collected over a period exceeding a few months, but occasionally cruises may extend for example, from December of one year to February of the next. In this case year should refer to beginning year.
38		Δ
39-80		Alphanumeric text which describes source of data and area from which data was collected. Use standard POP abbreviations (Appendix Table 20) and left justify the text. Enter the organization source (e.g. NOAA, USFS) and then the platform name from which the data was collected (e.g. SURVEYOR, FERRIES, UNK CHARTERS). Separate without a space the platform and area from which data was collected with a slash (/). Enter the general area from which data was collected (e.g. Bering, GOA). Example: USFS WICKERSHAM/SE AK translates as data collected aboard the vessel WICKERSHAM by the U.S. Forest Service in waters off the coast of southeastern Alaska. Note that in some instances, the above guidelines cannot always be followed. When this situation occurs use your own judgment as to how best to describe data source and collection location.

Instructions for filling out Data Cards

Columns	Variable Names as used by QCP1 1/	Definitions and Remarks
1- 6	RID	Record Identifier as found in columns 6-11 of Record ID Card.
7- 8	YR	Last two digits of year when sighting was made (e.g., 1975 = 75).
9-10	MO	Number corresponding to month of year.
11-12	DAY	Day of month.
13-16	HR, MIN	Time of observation by the 24 hour clock (e.g. 3:01 PM translates to 1501). Be very careful to record the proper time zone in colums 60-62. Conversion from one time zone to another, such as Pacific Standard Time (+8) to Greenwich Mean Time (Ø), by the person logging data should be kept to an absolute minimum. Such conversions, when necessary, are best done by the computer.
17		Δ
18-22	LH,LM,LS	Latitude in degrees (LH), minutes (LM) and tenths of a minute (LS). Degrees must be specified in columns 18-19. Minutes (columns 20-21) and tenths of minutes (22) may or may not be entered, depending on the resolution of data and whether or not the ship is on transit. If the ship is on transit, positions must be filled out at least to whole minutes of resolution. Leave LM and LS fields blank if minutes or tenths of minutes cannot be determined within ± 5 miles.
23	NS	"N" for north latitude "S" for south latitude
24-29	LLH,LLM,LLS	Longitude in degrees, minutes and tenths of minutes. Same logic applies as for latitude.
30	EW	"E" for east longitude "W" for west longitude
31	-	Δ
32-34	SPE	Species code (Appendix Table 21. Remember to right justify.

1/ Quality Control Program number 1 for shipboard data.

Columns	Variable Names	Definitions and Remarks
35	REL	Reliability of species identification. Enter a "T" if there is any doubt regarding the validity of the species identification made by the observer. If the identification appears valid (i.e., description of animals or known observer reliability), leave this column blank.
36	CONF	"Confidence interval" which sometimes can be ascribed to a sighting. Occasionally an observer will indicate that he/she saw 10 animals ± 2. So as not to lose this information, enter the following codes which best characterize the "confidence interval" of the sighting:

Code	Description
0	No error
1	plus or minus one animal
2	" " " two "
3	" " " five "
4	" " " 10 "
5	" " " 25 "
6	" " " 50 "
7	" " " 100 "
8	" " " 1000 "
9	represents a minimal estimate of number of animals seen (e.g. at least 10 animals)

37-40	NUM	Number of animals reported.
41-42	GROUP	Group size. If number of animals is reported as being in discrete groups (e.g.10 seals in pairs), then record the size of the groups. In this example, a group size of pairs = 2.
43-44	IDIR	Direction animals are swimming, if given. Indicate approximate direction using N=Due North, NW= northwest, SE=southeast, etc. Usage of this field does not follow conventional right justification. Always enter N or S in column 43 and always enter E or W in column 44.
45-46	BEHAVE	Behavior if noted. See Appendix Table 22 for applicable behavior codes.

Columns	Variable Names	Definitions and Remarks
47	PS	If given, indicate whether the animal(s) was first observed on the port or starboard side of the ship. Use "P" for port, "S" for starboard and blank for unknown.
48	POINTS	If given, indicate the number of points from the main axis of the ship that the animal(s) was first sighted. (4 points equates to 45° from dead ahead or from dead astern of the ship, 8 points equates to perpendicular to ship's line of travel).
49-51	IDIST	If given, indicate the initial sighting distance to animal in tens of meters (e.g. 100 meters = "10".
52	VISI	Surface Visibility Code-A subjective code that takes all factors that may affect visibility of marine mammals into account (Appendix Table 24.)
53-55	WATER	Water surface temperature in degrees celsius. If temperature is minus, enter a "-" sign in the column immediately adjacent (left) of temperature; if positive, leave blank. Use Appendix Table 23 if temperature conversion for Fahrenheit to Centigrade is necessary.
56	PTYPE	Platform Type. Enter code which most aptly describes where observation was made from:
57-59	SOURCE ID	Source Identifier (see Appendix Table 26)
60-62	TZ	Time Zone in which observation was recorded. This should be expressed as plus or minus so many hours as determined from Appendix Figure 3. This field and the time field are very important, especially when a record contains transit data. Time Zone boundaries for Alaska and the U.S. Pacific Coast are outlined in Appendix Figure 4. These boundaries are determined more from social rather than astronomical considerations. Note

Code	Description
1	Surface vessel
2	Aircraft
3	Ice station
4	Shore station

Column	Variable Names	Definitions and Remarks
		that each area will keep time in a different zone according to the time of year (e.g., for Seattle from 25 October through 24 April the time used is Pacific Standard Time which equals time zone plus eight [+8]; from 25 April through 24 October the time used is Pacific Daylight Savings Time which equals time zone plus seven [+7]. Generally, standard time is kept from 25 October to 24 April and daylight savings time is kept from 25 April to 24 October. In the western hemisphere, subtract one from the standard time zone to get the daylight savings time zone (e.g. PDT = +8 goes to PDST = 8-1 = +7). Observers will usually note which time zone they have used for their records, if not, then the logger must assume that time was kept in the appropriate zone for the area and time of year.
63	FLAG	Transit Flag: A "1" is used to indicate the beginning of a transit and a "2" is used to mark the end of a transit. A transit is defined as any straight line travelled by a ship or an aircraft where observation effort is made, and beginning and ending times and positions of transit are provided. Any string of sighting cards that have a "1" placed in column 63 on the first card of that string, and a "2" placed in column 63 on the last card of that string will be treated as a transit during data analysis. For every "1" that is indicated, a "2" must also exist at some later time.
64-80	TEXT	Comments may be made by the logger to help describe or add to information existing as coded data on each card. Use standard POP abbreviations when possible (Appendix Table 20).

APPENDIX TABLE 21.--Common and scientific names and corresponding codes for marine mammals reported by Platforms of Opportunity Project observers; names are ordered and spelled as found in Rice, 1977[1]. NE indicates no equivalent.

Code	Common name	Scientific name
UM	Polar bear	Ursus maritimus
OR	Walrus	Odobenus rosmarus
ZC	California sea lion	Zalophus californianus californianus (sp)
EJ	Northern sea lion	Eumetopias jubatus
CU	Northern fur seal	Callorhinus ursinus
EL	Sea otter	Enhydra lutris
PV	Harbor seal	Phoca vitulina
PL	Spotted seal; larga seal	Phoca largha
PH	Ringed seal	Phoca hispida
PF	Ribbon seal	Phoca fasciata
EB	Bearded seal	Erignathus barbatus
MA	Northern elephant seal	Mirounga angustirostris
UO	Unidentified otariid	NE
US	Unidentified phocid	NE
UP	Unidentified pinniped	NE
ER	Gray whale	Eschrichtius robustus
BA	Minke whale	Balaenoptera acutorostrata
BX	Bryde whale	Balaenoptera edeni
BB	Sei whale	Balaenoptera borealis
BP	Fin whale	Balaenoptera physalus
BL	Blue whale	Balaenoptera musculus
MN	Humpback whale	Megaptera novaeangliae
BG	Black right whale	Balaena glacialis
BM	Bowhead whale	Balaena mysticetus
SB	Rough toothed dolphin	Steno bredanensis
TT	Bottlenose dolphin	Tursiops truncatus
SL	Spinner dolphin	Stenella longirostris
SA	Spotted dolphin (Central Pacific)	Stenella attenuata
SG	Spotted dolphin (Eastern Pacific)	Stenella a graffmani
SC	Striped dolphin	Stenella coeruleoalba
DD	Saddleback dolphin	Delphinus delphis
LH	Shortsnouted whitebelly dolphin	Lagenodelphis hosei
LO	Pacific whiteside dolphin	Lagenorhynchus obliquidens
LB	Northern right whale dolphin	Lissodelphis borealis
GG	Whiteheaded grampus; gray grampus	Grampus griseus
FA	Pygmy killer whale	Feresa attenuata
PC	False killer whale	Pseudorca crassidens
GM	Shortfin pilot whale	Globicephala macrorhynchus
OO	Killer whale	Orcinus orca
PP	Harbor porpoise	Phocoena phocoena

APPENDIX TABLE 21.--Common and scientific names and corresponding codes for marine mammals reported by Platforms of Opportunity Project observers; names are ordered and spelled as found in Rice, 1977[1/]. NE indicates no equivalent. -- Continued

Code	Common name	Scientific name
PD	Dall porpoise	Phocoenoides dallii
DL	Belukha; beluga	Delphinapterus leucas
MM	Narwhal	Monodon monoceros
PM	Sperm whale	Physeter macrocephalus
BE	North Pacific giant bottlenose whale	Berardius bairdii
ZX	Goosebeak whale	Ziphius cavirostris
MS	Bering Sea beaked whale	Mesoplodon stejnegeri
UD	Unidentified dolphin/porpoise	NE
UZ	Unidentified large whale	NE
UX	Unidentified small whale	NE
UW	Unidentified whale	NE

1/ Rice, Dale W. 1977. A list of the marine mammals of the world. U. S. Dep. Commer., NOAA Tech. Rep. NMFS SSRF-711, 13 p.

APPENDIX TABLE 22.--Types of behavior and corresponding Codes utilized in the Platforms of Opportunity Project format. Behavior is broken down into four categories: in the water, hauled on land, hauled on ice, and miscellaneous.

0 - 30 -- In water

01 - No specific behavior other than in the water
02 - Sleeping
03 - Courtship or breeding behavior
04 - Feeding
05 - Mother with young
06 - Aggressive
07 - Nonspecific contact/play
08 - Bow riding
09 - Porpoising
10 - Following vessel (e.g. Sea Lions following a fishing vessel)
11 - Attracted by fish nets
12 - Associated with cetacea
13 - Associated with pinniped
14 - Associated with birds
15 - Associated with cetacea and birds
16 - Associated with pinnipeds and birds
17 - Associated with pinnipeds and cetaceans
18 - Associated with pinnipeds, cetaceans, and birds
19 - Associated with kelp
20 - Associated with Shrimp, euphausids, etc. Krill
21 - Associated with school of baitfish (length under 18 inches)
22 - Associated with larger fish (length over 18 inches)
23 - Associated with concentrations of squid
24 - Associated with vessel and cetacean
25 - Associated with vessel and pinniped
26 - Synchronous diving
27 - Dead animal
28 - Breaching
29 - Avoidance
30 - Lob-tailing

31 - 60 -- On Land

31 - No specific behavior noted
32 - Sleeping
33 - Breeding and pupping (Rookery)
34 - Feeding
35 - Mother with young
36 - Mother with young nursing
37 - Aggressive
38 - Nonspecific contact/play
39 - Thermoregulatory
40 - Dead animal
41-60 - Unassigned

APPENDIX TABLE 22.--Types of behavior and corresponding Codes utilized in the Platforms of Opportunity format. Behavior is broken down into four categories: in the water, hauled on land, hauled on ice, and miscellaneous.--Continued

61 - 80 -- On Ice
61 - No specific behavior noted
62 - Sleeping
63 - Breeding and pupping rookery
64 - Feeding
65 - Mother with young nursing
66 - Mother with young
67 - Aggressive
68 - Nonspecific contact/play
69 - Dead animal
70 - Unassigned
81 - Hauled on floating debris other than ice

90 - 99 -- Miscellaneous
90 - Spyhopping

Additional notes on behavior can be made in the comments field.

APPENDIX TABLE 23.--Temperature Conversion Table.

Fahrenheit	Celsius	Fahrenheit	Celsius
90	32.2	58	14.4
88	31.1	56	13.3
86	30.0	54	12.2
84	28.0	52	11.1
82	27.8	50	10.0
80	26.7	48	8.9
78	25.6	46	7.8
76	24.4	44	6.7
74	23.3	42	5.6
72	22.2	40	4.4
70	21.1	38	3.3
68	20.0	36	2.2
66	18.9	34	1.1
64	17.8	32	0.0
62	16.7	30	-1.1
60	15.6	28	-2.2
		26	-3.3

APPENDIX TABLE 24.--Explanation of surface visibility codes used in the Platforms of Opportunity Project computer format.

Code	Explanation
1	Excellent - Surface of water calm, a high overcast solid enough to prevent sun glare. Marine mammals will appear black against a uniform gray background.
2	Very Good - May be a light ripple on the surface or slightly uneven lighting but still relatively easy to distinguish animals at a distance.
3	Good - May be light chop, some sun glare or dark shadows in part of the survey track. Animals up close (300 meters or less) can still be detected and fairly readily identified.
4	Fair - Choppy waves with some slight white-capping, sun glare or dark shadows in 50% or less of the survey track. Animals much further away than 300 meters are likely to be missed.
5	Poor - Wind in excess of 15 knots, waves over two feet with whitecaps, sun glare may occur in over 50% of the survey track. Animals may be missed unless within 100 meters of the survey trackline, identification difficult except with the larger species.
6	Unacceptable - Wind in excess of 25 knots, waves over three feet high with pronounced whitecapping. Sun glare may or may not be present. Detection of any marine mammal unlikely unless the observer is looking directly at the place where it surfaces. Identification very difficult due to improbability of seeing animal more than once.

APPENDIX TABLE 25.--Codes used in the Platforms of Opportunity format to designate the type of platform from which observations were made.

Code	Platform Type
1	Surface vessel
2	Aircraft
3	Ice station
4	Shore station

APPENDIX TABLE 26.--Source codes used in the Platforms of Opportunity format to designate specific aircraft, vessels or organizations that contribute sighting data.

Codes 001 thru 049 are reserved for NOAA vessels.

Code	Vessel name
001-	Oceanographer
002-	Discoverer
003-	Surveyor
004-	Fairweather
005-	Rainier
006-	Miller Freeman
007-	MacArthur
008-	Davidson
009-	David Starr Jordan
010-	Oregon
011-	Cobb
012-	Kelez
013-	Pribilof
014-	Townsend Cromwell

Codes 050 thru 069 are reserved for U.S. Forest Service data from Alaska State Ferries.

Code	Vessel name
051-	MV EL Bartlett
052-	MV Tustemena
053-	MV Wickersham
054-	MV Matanuska
055-	MV Taku
056-	MV Malaspina
057-	MV Columbia

APPENDIX TABLE 26.--Source codes used in the Platforms of Opportunity format to designate specific aircraft vessels or organizations that contribute sighting data.

Codes 070 thru 299 are reserved for miscellaneous surface vessels.

Code	Vessel name
071-	RV Alpha Helix
072-	RV Resolution
073-	RV Acona
074-	RV Thomas G. Thompson
075-	RV Tordenskjold
076-	RV Moana Wave
077-	Tonquin
078-	Montegue
201-	New St. Joseph
202-	Mark I
203-	Discovery (Sam Guill)
204-	Trinity
205-	Tacoma
206-	Harmony
207-	Morningstar
208-	Lynn Ann
209-	GB Reed
210-	Nordic Prince
211-	Aleutian Tern
212-	Surfbird
213-	Lindblad Explorer
214-	Glacier Queen
215-	Bartlett
216-	Shelby D
217-	Yankee Clipper
218-	Aikane
219-	Orient
220-	Carter
221-	Diakan
222-	Lindy
223-	St. Michael
224-	Yaquina
225-	Windward
226-	Pat San Marie
227-	China Bear
228-	Anna Marie
229-	Susetta
230-	Flying Cloud

APPENDIX TABLE 26.--Source codes used in the Platforms of Opportunity format to designate specific aircraft vessels or organizations that contribute sighting data.--Continued

Codes 300 thru 399 are reserved for U. S. Coast Guard Vessels

Code	Vessel name
301-	USCG Polar Star
302-	USCG Confidence
303-	USCG Boutwell
304-	USCGC Storis
305-	USCGC Glacier
306-	USCGC Winona
307-	USCGC Iris
308-	USCGC Minnetonka
309-	Not assigned
310-	USCGC Ironwood
311-	USCGC Midgett
312-	USCGC Rush
313-	USCGC Modoc
314-	USCGC Mellon
315-	USCGC Resolute
316-	USCGC Campbell
317-	USCGC Yocona
318-	USCGC Jarvis
319-	USCGC Burton Island

Codes 400 thru 499 are reserved for fishing vessels of various fishing organizations.

Code	Vessel name
401-	Maranatha
402-	Ole B.
499-	Unid. Troller

Codes 500 thru 989 are presently unreserved.

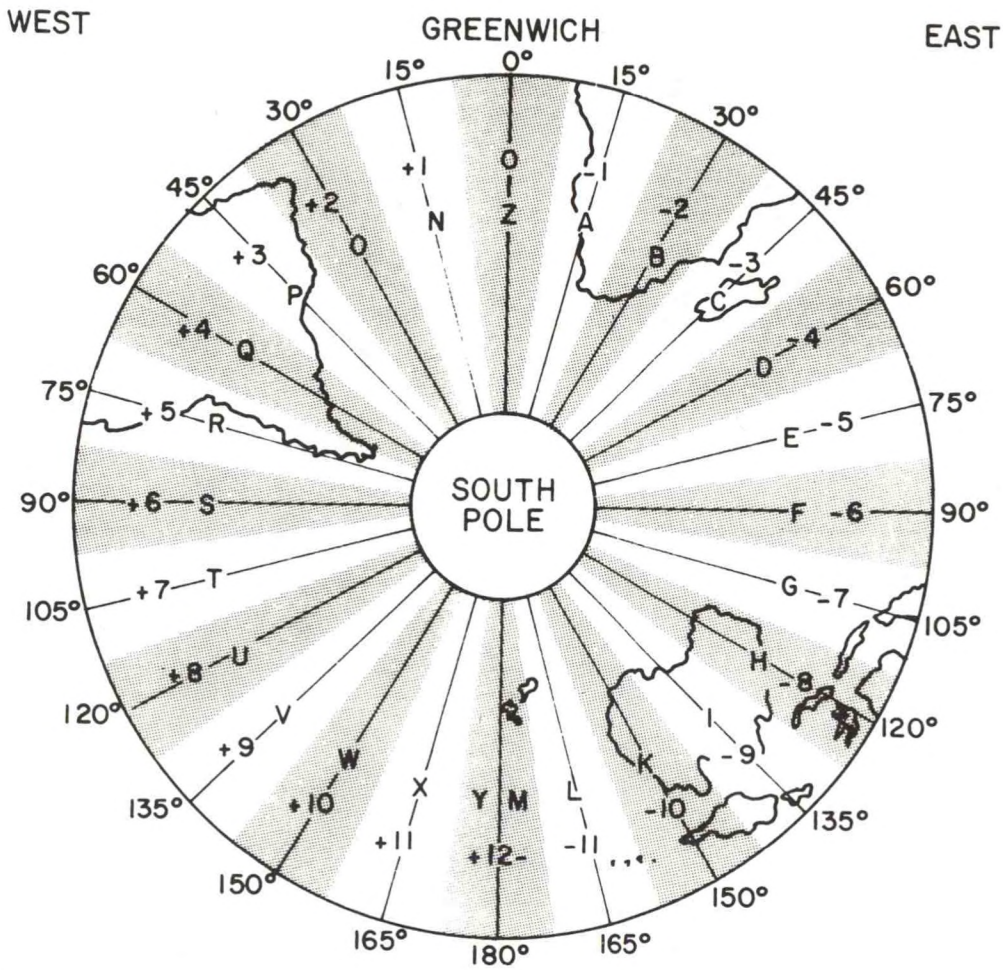
APPENDIX TABLE 26.--Source codes used in the Platforms of Opportunity format to designate specific aircraft vessels or organizations that contribute sighting data.--Continued

Codes 990 thru 998 have been reserved for data submitted by various persons or organizations where the vessel is unidentified.

Code	Organization
990-	U.S. Forest Service
991-	NOAA, NMFS Enforcement Division
992-	Coast Guard
993-	Mr. Terry Wahl
994-	Foreign Vessel Prgm., NMFS
995-	International Pacific Halibut Commission
996-	Marine Mammal Division, observer unidentified
997-	Fish & Wildlife Service
998 -	Marine Mammal Division, pelagic sealing

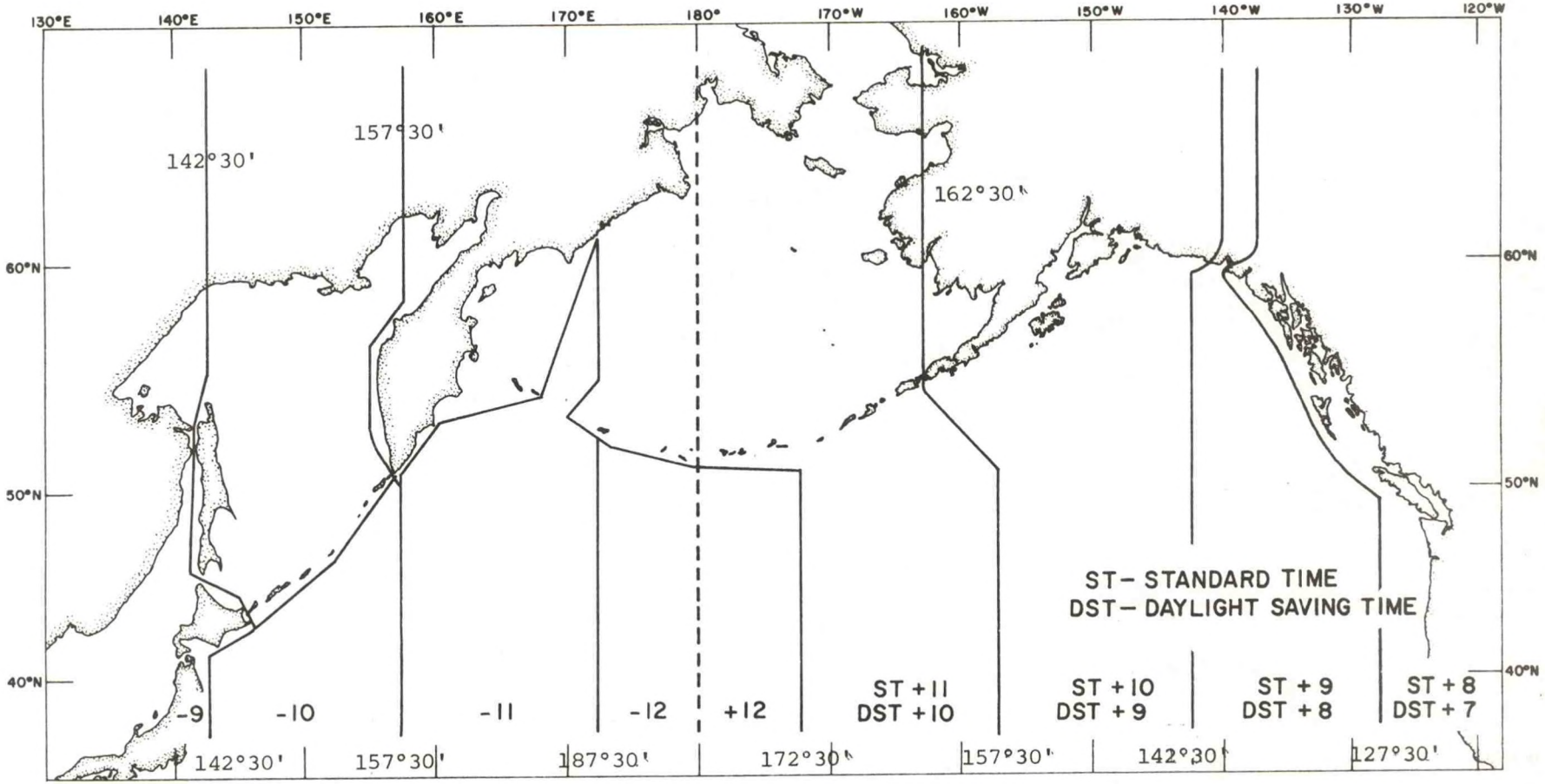
The names of individuals within the above organizations who made observations will be included in the comments field where possible.

Code 999 is used to identify data that is received from miscellaneous sources on a one-time only basis. Cases with this source ID are more fully documented in the raw data files under miscellaneous.



1/ Appendix Figure 3.--Diagram of earth's time zones with numeric and alphameric designators. Subtract one hour from numeric designator for daylight savings time (e.g. +8 is Pacific Standard Time, PST, which becomes +7 or Pacific Daylight Savings Time, PDST, from April 25th to October 24th).

1/ Adapted from Dutton's Navigation and Piloting, 1957.



Appendix Figure 4.--Map of North Pacific Legal Time Zone boundaries as taken from the Rand McNally Cosmopolitan World Atlas. Daylight savings time is normally used from April 25th through October 24th each year with standard time being used the remainder of the year.

Appendix-Field Format Example 1

This is a copy of the Marine Observation and Station Abstract (MOSA) which is used by Outer Continental Shelf Environmental Assessment Program contract vessels to record information which includes marine mammal transit and sighting data. The PROVISIONAL OCSEAP NAVIGATION SUBINSTRUCTION (1976) FIELD SEASON for filling out the Marine Operations Abstract (MOA) was used by observers to transcribe information onto the MOSA. Water surface temperature and Surface Visibility are taken directly from or deduced from the accompanying Deck Log-Weather Observation Sheet (NOAA Form 77-13J). Please note that the MOA and MOSA are kept in Greenwich Mean Time and that the Weather Observation Sheet is kept in local mean time (+9 in this case). Care must be taken when transcribing data from these sources to the Platforms of Opportunity Project format not to confuse time zones. Entries that have been selected for transcription to the example POP format have been circled on the MOSA.

MARINE OBSERVATION AND STATION ABSTRACT

SHIP: Discoverer | LOCALITY: G.O.A. Kodiak | O.S. SHEET NO.: ch 16580 | SHEET NO.: 3 | PLOTTI

PROJECT NAME: OCSEAP | PROJECT NO.: RP-4-D1-77 | CRUISE: A | LEG: VI

INVESTIGATORS:

POSITION RESOLUTION CODE — THIS IS AN INDICATION OF THE RESOLUTION AND STRENGTH OF THE POSITIONING SYSTEM(S) USED
A ±0-.25 MILE | B ±.25-.5 MILE | C ±.5-1.0 MILE | D ±1.-2. MILES | E ±2.-4 MILES | F >±4. MILES

MODE: 1. STEAMING AT CONST. COURSE AND SPEED | 2. MANEUVERING | 3. HOLDING STATION | 4. OTHER (REMARKS)

DATES COVERED: 21 MAY 77 | DATE PREPARED: 21 MAY 77

TIME OF OPERATION: JULIAN DATE	BEGINNING TIME (GMT)	ENDING TIME (GMT)	TIME ZONE	SMOOTHED POSITION: LATITUDE	LONGITUDE	POS RES CODE	MADE GOOD: COURSE	SPEED	MODE	DEPTH (METERS)	EVENT CODE	OPERATIONS AND REMARKS	STA NO.
141	0531		+9	56 15.0	153 57.6	C	223	13.9	1	-	74	4 Dall's Porpoise (c) Dead ahead ✓	
	1330			55 23.3	156 42.6	C	271	14.0	1	-	74	2 (c) MINKE WHALE ✓	
	1445			55 23.8	157 13.7	C	↓	↓	1	91	71	Begin Bird Transect	
		1500		55 23.8	157 19.7	C	271	14.0	1	88	71	END BIRD TRANSECT	
	1500			55 23.8	157 19.7	C	273	14.0	1	88	71	BEGIN BIRD TRANSECT	
		1515		55 24.1	157 25.9	C			1	88	71	End Bird Transect	
	1545			55 24.5	157 37.8	C			1	90	71	Begin Bird Transect	
		1600		55 24.7	157 44.0	C			1	88	71	End Bird Transect	
	1600			55 24.7	157 44.0	C	↓	↓	1	88	71	Begin Bird Transect	
		1615		55 24.9	157 50.0	C	273	14.0	1	82	71	End Bird Transect	
	1630			55 24.9	157 56.5	C	273	14.0	1	-	74	2 (c) DALLS PORPOISE ✓	
	1700			55 25.2	158 08.9	C	273	13.8	1		74	Begin NMFS Mammal Transit ✓	
	1700			↓	↓	C			1	127	71	Begin Bird TRANSIT	
		1715		55 25.5	158 15.0	C			1	135	71	END BIRD MR 3.4	
	1715			↓	↓	C			1	↓	71	BEGIN BIRD	
	-	1730		55 25.7	158 21.4	C	↓	↓	1	143	74	END MAMMAL MR 6.9 ✓	

:8 WORKSHEET 002

MARINE OBSERVATION AND STATION ABSTRACT

SHIP: Discoverer | LOCALITY: W60A | O.S. SHEET NO.: 16013 | SHEET NO.: 4 | PLOT:

PROJECT NAME: OCSEAP | PROJECT NO.: RU-4-OE-77 | CRUISE: A | LEG: XI

INVESTIGATORS:

POSITION RESOLUTION CODE — THIS IS AN INDICATION OF THE RESOLUTION AND STRENGTH OF THE POSITIONING SYSTEM(S) USED
A ±0-.25 MILE | B ±.25-.5 MILE | C ±.5-1.0 MILE | D ±1.-2. MILES | E ±2.-4. MILES | F >±4. MILES

MODE: 1. STEAMING AT CONST. COURSE AND SPEED | 2. MANEUVERING | 3. HOLDING STATION | 4. OTHER (REMARKS)

DATES COVERED: 21 MAY 77

DATE PREPARED: 21 MAY 77

TIME OF OPERATION				SMOOTHED POSITION			MADE GOOD						
JULIAN DATE	BEGINNING TIME (GMT)	ENDING TIME (GMT)	TIME ZONE	LATITUDE	LONGITUDE	POS. RES. CODE	COURSE	SPEED	MODE	DEPTH (METERS)	EVENT CODE	OPERATIONS AND REMARKS	ST NO
141	[illegible]	1720	+9	55 25.7	158 21.4	C	273	13.8	1	143	71	END BIRD MR 3.4	
	1720			↓	↓	C			1	143	71	BEGIN BIRD	
		1745		55 25.8	158 22.5	C			1	144	71	END BIRD MR 3.4	
	1745			↓	↓	C	↓	↓	1		74	BEGIN Mammal	✓
		1815		55 26.1	158 40.1	C	↓	↓	1		74	END Mammal MR 6.9	✓
	1830			55 26.4	158 46.4	C	274	14.2	1		74	Begin Mammal	✓
		1900		55 26.2	158 59.4	C	274	14.2	1		74	END Mammal MR 7.1	✓
	1915			55 26.2	159 04.4	C	262	16.2	1		74	Begin Mammal	✓
		1945		55 25.2	159 18.2	C			1		74	END Mammal MR 8.1	✓
	2002			55 24.7	159 25.4	C			1		74	Begin Mammal -	✓
	2015			55 24.2	159 32.1	C			1	23	71	Begin Bird	
		2030		55 23.3	159 39.2	C			1	125	71	END Bird 4.0 N.M. Run	
	2030			55 23.3	159 39.2	C			1	125	71	Begin Bird	
		2045		55 22.9	159 46.4	B			1	87.8	71	END Bird 4.0 MR	
		2045		↓	↓	B	↓	↓	1		74	END Mammal	
	2157			55 22.1	160 15.1	A	280	15.0	1		74	1 DALLS Porpoise 3/66 Fifyard	✓

OCS WORKSHEET 002

MARINE OBSERVATION AND STATION ABSTRACT

SHIP: Discoverer | LOCALITY: LW 60A | O.S. SHEET NO.: chart 16013 | SHEET NO.: 5 | PLOT

PROJECT NAME: OCSEAP | PROJECT NO.: RP-4-DI-77 | CRUISE: A | LEG: VI

INVESTIGATORS:

POSITION RESOLUTION CODE — THIS IS AN INDICATION OF THE RESOLUTION AND STRENGTH OF THE POSITIONING SYSTEM(S) USED: A ±0-.25 MILE; B ±.25-.5 MILE; C ±.5-1.0 MILE; D ±1.-2. MILES; E ±2.-4. MILES; F >±4. MILES

MODE: 1. STEAMING AT CONST. COURSE AND SPEED; 2. MANEUVERING; 3. HOLDING STATION; 4. OTHER (REMARKS)

DATES COVERED: 21-22-M

DATE PREPARED: 21 May

TIME OF OPERATION				SMOOTHED POSITION			MADE GOOD						
JULIAN DATE	BEGINNING TIME (GMT)	ENDING TIME (GMT)	TIME ZONE	LATITUDE	LONGITUDE	POS FIES CODE	COURSE	SPEED	MODE	DEPTH METERS	EVENT CODE	OPERATIONS AND REMARKS	ST. NO
141	2330		+9	55° 23.8'	160° 52.1'	A	280	15.0	1		74	BEGIN NMFS Mammal	
142		0000		55° 20.6'	161° 03.6'	A	↓	↓	1		74	End NMFS Mammal	
	0450			54° 54.1'	162° 32.6'	A	216	14.5	1		74	1 Sea Otter 25m on Stbd beam Watching ship	
	1311			54° 25.2'	165° 16.0'	A	310	3.5	1	160	42	BEGIN BONGO OBLIQUE 70 TO 70 M	001
		1328		54° 25.8'	165° 17.1'	A	310	3.5	1	160	42	END BONGO TOW	001
	1445			54° 34.7'	165° 38.0'	B	304	14.2	1	320	71	BEGIN BIRD TRANSECT	—
		1500		54° 36.7'	165° 42.9'	B	304	14.2	1	363	71	END BIRD TRANSECT	—
	1500			54° 36.7'	165° 42.9'	B	299	14.2	1	363	71	BEGIN BIRD TRANSECT	—
		1515		54° 38.1'	165° 48.1'	B	↓	↓	1	376	71	END BIRD TRANSECT	—
	1515			54° 38.1'	165° 48.1'	B			1	376	71	BEGIN BIRD TRANSECT	—
		1530		54° 39.8'	165° 53.2'	B			1	354	71	END BIRD TRANSECT	—
	1530			↓	↓	B			1	354	74	1 (C) KILLER WHALE	—
	1530			54° 39.8'	165° 53.2'	B	↓	↓	1	354	71	BEGIN BIRD TRANSECT	—
	1540			54° 40.9'	165° 56.7'	B	299	14.2	1		74	10-12 (E) DALLS PORPOISE	—
		1545		54° 41.5'	165° 58.3'	B	299	14.2	1	307	71	END BIRD TRANSECT	—
	1549			54° 41.7'	165° 58.9'	B	302	41.1	3	307	42	BEGIN BONGO OBLIQUE	002

CS WORKSHEET 002

NOAA FORM 77-13d (3-76) — U.S. DEPARTMENT OF COMMERCE, NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DECK LOG – WEATHER OBSERVATION SHEET

SHIP	DAY	DATE	TIME ZONE
DISCOVERER R-102	FRIDAY	20 MAY 77	+9 (V)

MOORED KODIAK, ALASKA: WOMENS BAY, GULF OF ALASKA

TIME	POSITION (Lat. and Long.)	PRESENT WEATHER	VISIBILITY (N.M.)	WIND DIR. (True)	WIND SPEED (Kts.)	SEA WAVE HEIGHT (Ft.)	SWELL WAVES DIR. (True)	SWELL WAVES HEIGHT (Ft.)	SEA WATER TEMP. °C	SEA LEVEL PRESSURE (mb)	TEMPERATURE °C DRY BULB	TEMPERATURE °C WET BULB
01												
02												
03												
04	57.7N 152.5W	PC	11	—	CALM					1012.1	1.9	1.6
05												
06												
07												
08	57.7N 152.5W	PC	12		CALM					1013.8	3.8	3.7
09	57.7N 152.5W	PC	12		CALM					1013.5	5.1	3.9
10	57.7N 152.3W	PC	12		CALM					1013.5	5.0	4.0
11	57.7N 152.2W	PC	12	105	8	1	120	2	5.6	1013.5	5.0	4.1
12	57.7N 152.0W	PC	12	105	7	—	120	2	5.9	1013.9	5.2	4.3
13	57.6N 152W	PC	12	130	10	—	120	3	5.8	1014.0	5.9	5.1
14	57.3N 152W	PC	12	130	9	-	120	2	5.9	1014.0	5.8	5.0
15	57.2N 152.1W	PC	12	125	5	-	120	3	5.9	1014.0	5.3	5.0
16	57.0N 152.7W	PC	12	215	5	1	190	4	6.5	1014.0	4.8	3.7
17	56.8N 152.9W	PC	12	220	4	1	190	4	6.0	1013.8	5.2	2.9
18	56.7N 153.2W	PC	12	220	4	1	200	4	6.2	1013.5	4.9	2.7
19	56.5N 153.5W	PC	12	070	6	1	195	4	6.1	1013.2	3.2	2.5
20	56.3N 153.8W	PC	12	170	5	0	210	3	6.3	1013.0	4.9	2.8
21	56.3N 153.9W	PC	12	180	5	1	200	3	6.5	1012.9	4.4	3.7
22	56.1N 154.3W	PC/C	12	190	8	—	190	3	6.2	1012.9	4.1	3.9
23	55.9N 154.7W	PC	10	150	6	—	190	2	6.1	1012.5	3.0	2.1
24	55.7N 154.9W	PC	10	170	5	—	190	2	6.0	1012.0	2.6	1.8

REMARKS
0437- SUNRISE 0550- SNOW SHOWER 1800- SQUALS ON HORIZON. 1900- WIND SHIFT FROM PASSING SQUAL 2133 SUNSET

NOAA FORM 77-13d (3-76)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

DECK LOG – WEATHER OBSERVATION SHEET

A SHIP	DAY	DATE	TIME ZONE
DISCOVERER	SAT.	21 MAY 77	+9

ENROUTE BERING SEA

TIME	POSITION (Lat. and Long.)	PRESENT WEATHER	VISIBILITY (N.M.)	WIND		SEA WAVE HEIGHT (Ft.)	SWELL WAVES		SEA WATER TEMP. °C	SEA LEVEL PRESSURE (mb)	TEMPERATURE °C	
				DIR. (True)	SPEED (Kts.)		DIR. (True)	HEIGHT (Ft.)			DRY BULB	WET BULB
01	55.5N 155.3W	PC	12	175	8	—	200	3	6.1	1011.8	2.7	2.0
02	55.4N 155.7W	PC	12	185	6	—	200	3	6.1	1011.3	3.5	2.8
03	55.3N 156.1W	PC	12	180	5	—	200	3	6.1	1011.0	3.5	3.0
04	55.4N 156.5W	PC	12	180	13	—	200	3	6.3	1010.5	3.7	2.5
05	55.5N 156.9W	PC	12	—	CALM	—	210	3	5.5	1010.1	2.8	2.2
06	55.4N 157.3W	PC	12	270	5	—	200	3	5.3	1010.0	3.0	2.5
07	55.4N 157.7W	PC	12	—	CALM	—	220	3	5.8	1010.0	2.9	1.8
08	55.4N 158.1W	PC	12	115	4	—	205	3	5.9	1010.0	4.0	2.8
09	55.4N 158.5W	PC	12	—	CALM	—	185	2	5.9	1010.0	3.8	2.8
10	55.4N 158.8W	PC	12	210	5	—	180	2	5.6	1010.0	4.3	2.8
11	55.5N 159.3W	PC	12	200	2	—	200	1	5.7	1010.1	4.1	3.0
12	55.4N 159.8W	PC	12	200	C-3	—	200	1	5.9	1010.1	5.0	3.1
13	55.4N 160.1W	PC	8	170	2/3	—	CALM		5.2	1010.1	5.0	3.8
14	55.4N 160.7W	C/L/S	5	110	1/2	—	CALM		5.8	1010.1	3.0	3.0
15	55.4N 161.1W	PC	12	175	9	1	CALM		5.1	1010.1	4.5	4.0
16	55.4N 161.5W	PC	12	200	12	1	—	—	5.2	1010.0	4.6	4.0
17	55.3N 161.9W	PC	12	175	18	2	—	—	5.1	1009.8	4.8	3.9
18	55.1N 162.1W	PC	12	175	19	2	—	—	4.8 5.1	1009.5	4.2	3.9
19	55.0N 162.4W	PC	10	220	11	1	—	—	4.8	1009.5	4.9	3.8
20	54.9N 162.5W	CL	12	245	13	1	—	—	5.0	1009.5	4.4	3.2
21	54.7N 162.8W	CL	12	205	12	2	—	—	5.1	1009.5	4.8	3.7
22	54.6N 163.1W	CL	12	210	14	2	215	3	5.1	1009.7	5.0	3.3
23	54.5N 163.5W	PC	12	250	10	1	230	3	5.8	1009.8	4.0	3.0
24	54.4N 163.9W	PC	12	180	11	1	225	3	5.1	1009.8	3.4	2.8

REMARKS

0330 - RAIN/HAIL SHOWER, SQUALS ABOUT THE HORIZON. 0505 - SUNRISE 0900 - SQUALS STILL ABOUT THE HORIZON. 1200 GORMAN STRAIT 1300 KOROVIN STRAIT 1345 UNGA STRAIT 1900 DEER PASSAGE 2110 - RAW SHOWER 20 - SQUALS ON HORIZON 2157 - SUNSET.

Marine Mammal Platforms of Opportunity

Page 1 of 1

Date Submitted for keypunching _____

Example 1

Logged by P. McGuire, Date _____

Checked by _____, Date _____

year	mo.	day	hour	min.	Deg.	Min.	N/S	Deg.	Min.	E/W	Species	Reliability	Confidence Interval	Number Animals	Group Size	N/S Direction E/W Headed	Behavior Code	Port P/Stbd S Points 1pt=90°	Initial Distance in tens of meters eg. 1=10 meters	Visibility Code	Water Surface Temperature +/- C°	Platform Type	Platform ID	Time Zone GMT +/-7	Flag Column	TEXT
77	05	20	2031		56	150	N	153	576	W	PD		0	4			01	Ø		3	6	1002	7		
		21	0430		55	233		156	426		BA		0	2			01			3	6				
			0730		55	249		157	565		PD		0	2			01			3	6				
			0800		55	252		158	089											3	6				
			0830		55	257		158	214											3	6				
			0845		55	258		158	275											3	6				
			0915		55	261		158	401											2	6				
			0930		55	264		158	464											2	6				
			1000		55	267		158	594											2	6				
			1015		55	262		159	044											2	6				
			1045		55	252		159	183											2	6				
			1100		55	247		159	254											2	6				
			1145		55	229		159	464											2	6				
			1257		55	221		160	151		PD		0	1			01	P	1	2	5				
			1430		55	238		160	521											2	5				
		21	1500		55	206		161	036											2	5				
			1950		54	541		162	326		EL		0	1			01	S8	3	2	5				
		22	0630		54	398		164	553	W	LO		02	1			01				5				
77	05	22	0640		54	409	N	165	567	W	PD		2	1			01				5	1002	9		

Appendix-Field Format Example 2.

This is a copy of an older version of the standard Platforms of Opportunity Project (POP) Marine Mammal Observation Log filled out by the NOAA Ship DAVIDSON. This field format was used by all NOAA Pacific Fleet Vessels during 1974 and 1975, NOAA vessels doing OCSEAP work began using the Marine Observation and Station Abstract in 1976. The latest POP Log is presented in Field Format Example 3.

The Observation Effort Section is checked for transit information and, if it appears to be valid straight line course data, is transcribed into the POP format as transit information (FLAG = 1 and 2 cards). In this example, transit information would not be coded because of the necessity of the vessel to change course and speed while transiting narrow inland passages. If the Deck Log - Weather Observation Sheets (see example 1) had been sent in by the ship for this period, water temperature and surface visibility would also have been coded into the POP format.

MARINE MAMMAL OBSERVATION LOG

Page 4 of _____

VESSEL NOAA SHIP DAVIDSON DATE 11 MAY 71

Observation Effort (even if nothing seen):

Time: From 0800 Zone 7 To 1906

Position: From Petersburg Alaska To N58 10', 135°09.5'

Average Speed 13 Knots or mph (circle one)

Weather Sc. Hvrd Showers

Sea State FLAT

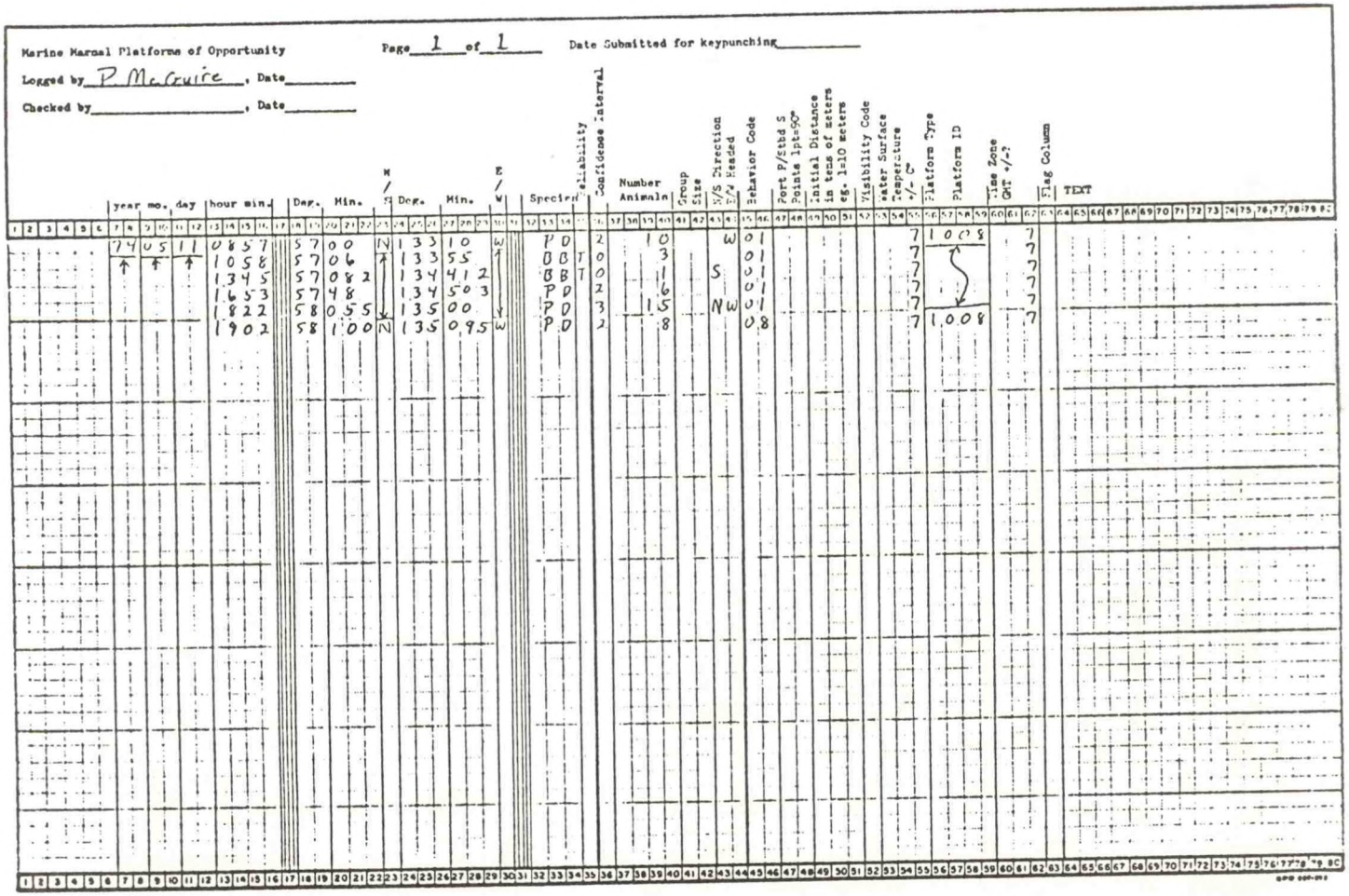
Water Temp. 44°F

Time (hours)	Location Lat. Long.	Kind (species)	No.	Notes*
0857 Zone 7	57°00' N 133-10W	PHOCOENOIDES DALLI	10	DALL'S PORPOISE, WEST-BOUND
1058	57 06N 133 55W	Balaenoptera borealis T	3	Appeared to be Sei whales surfacing often (1-2 min. apart). Remained near surface. Occasionally dorsal fin was visible when whale blew. Behavior matched well with description of Sei whale.
1345 +7 from GMT	57 08.2N 134 41.2W	~~Blue~~ ~~Finback~~ ~~Whale~~ Balaenoptera borealis T	1	Whale headed South in the center of Chatham Straight in SE. Alaska (GLO)
1653	N57°48' 134°50.3'W	Phocoenoides dalli	6	Scattered - several hundred yards apart except for two travelling close together
1822	N58°05.5 135°00W	Phocoenoides dalli	10-20	Scattered - moving in a NW direction. Rolling gently on surface.
1902	N58°10.0' 135°09.5'W	Phocoenoides dalli	~~15~~ 8	Scattered - followed along for 10-15 min.

* Include the following when possible, sketch; photograph; size; direction of travel; behavior; associated animals (birds, fish) FEATURES USED FOR IDENTIFICATION, course changes of vessel.

Name: _____
Address: _____
Tel No.: _____

GPO 988-035



Marine Mamal Platforms of Opportunity

Page 1 of 1 Date Submitted for keypunching

Logged by P McGuire, Date

Checked by , Date

year	mo.	day	hour	min.	Deg.	Min.	N/S	Deg.	Min.	E/W	Species	Reliability	Confidence Interval	Number Animals	Group Size	N/S Direction Pod Headed	Behavior Code	Port P/Stbd S Points 1pt=90°	Initial Distance in tens of meters eg. 1=10 meters	Visibility Code	Water Surface Temperature +/- C	Platform Type	Platform ID	Time Zone GMT +/-?	Flag Column	TEXT
74	05	11	0857		57	00	N	133	10	W	PD	T	2	10		W	01				7	1008		7	
			1058		57	06		133	55		BB	T	02	3		S	01				7			7	
			1345		57	082		134	412		BB	T	02	1			01				7			7	
			1653		57	48		134	503		PD		02	6			01				7			7	
			1822		58	055		135	00		PD		03	15		NW	01				7			7	
			1902		58	100	N	135	095	W	PD		02	8			08				7	1008		7	

Appendix-Field Format Example 3.

This is a standard Platforms of Opportunity Marine Mammal Log taken from a cruise with an Observer from Marine Mammal Division aboard. The sheet contains transit, sighting and environmental data. Data on the computer format sheet prior to 1105 are from another Field log sheet which is not included here.

May 13 1977

MARINE MAMMAL LOG

VESSEL Discoverer /OBSERVER Mc Guire

TIME ZONE GMT -10 HEADING (If constant)_____° TRUE or MAGNETIC?

NAUTICAL MILES TRAVELLED_____ SPEED MADE GOOD (KNOTS)_____

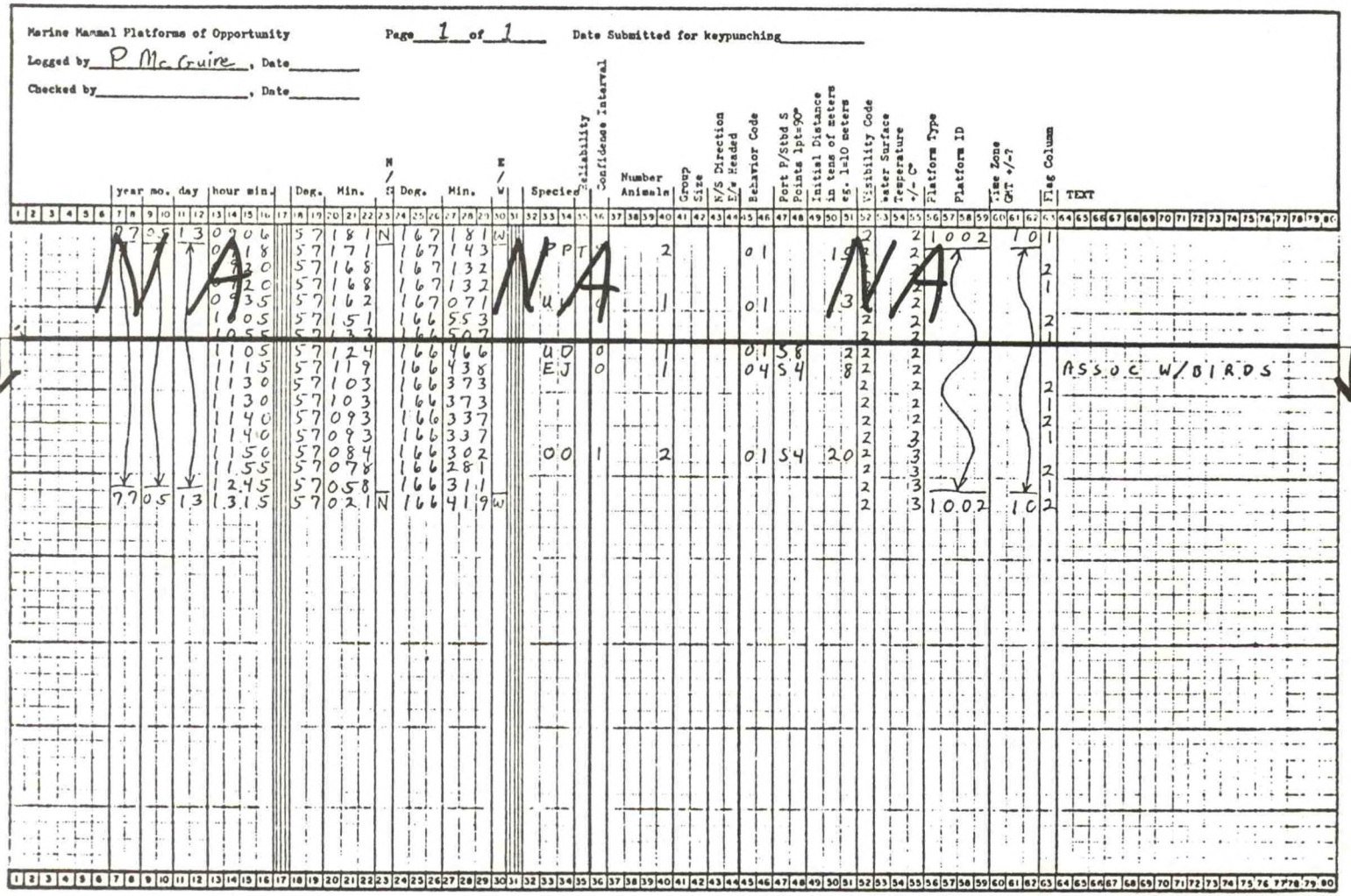
BEGIN WATCH: Date (Yr/Mo/Day) ____/____/____ Time _____

Position ____°/____'/____"(N/S) ____°/____'/____"(E/W)

END WATCH : Date (Yr/Mo/Day) ____/____/____ Time _____

Position ____°/____'/____"(N/S) ____°/____'/____"(E/W)

TIME	LOCATION	SPECIES	NO.	RELATIVE BEARING & DISTANCE	NOTES: BEHAVIOR, SKETCHES, WEATHER, WATER TEMP., PHOTOS, ASSOC. SPECIES.
1105	57°12.4 166°46.6	unid. dolphin	1	20m	sthd side, brief glimpse only Water Temp. 2°C
1115	57°11.9 166°43.8	E. jubatus	1	80m	sthd bow, had fish in its mouth, birds (10 or so) flocked around to get in on the goodies
1130	57°10.3 166°37.3				change Course (End Transect)
1130 to 1140	"				Begin Transect water = 1.8°C visib = very good
1140	57°09.3 166°33.7				change Course (End transect)
1140	"				Begin Transect water = 2.6°C visib = very good
1150	57°08.4 166°30.2	Orca	2	200m	sthd bow, just saw tall black dorsal fins briefly
1155	57°07.8 166°28.1				end Transect
1158 - 1235				on	CTD Station No. 75
1245 to 1315	57°05.8 166°31.1				start transect water = 2.9°C visib = very good
	57°02.1 166°41.9				end transect


Marine Mammal Platforms of Opportunity
Page 1 of 1
Date Submitted for keypunching
Logged by P McGuire, Date
Checked by, Date
year mo. day hour min
Deg. Min. N/S
Deg. Min. E/W
Species
Reliability
Confidence Interval
Number Animals
Group Size
N/S Direction F/a Headed
Behavior Code
Port P/Stbd S Points 1pt=90°
Initial Distance in tens of meters eg. 1=10 meters
Visibility Code
Water Surface Temperature +/- C°
Platform Type
Platform ID
Time Zone GMT +/-?
Flag Column
TEXT
NA
NA
NA
ASSOC W/BIRDS

Appendix-Field Format Example 4.

Example 4 is an abstract of marine mammal sightings made from the NOAA Ship Townsend Cromwell on Cruise 68 during 1976. Data was compiled by the National Marine Fisheries Service Southwest Fisheries Center. No environmental or transit data are provided with this abstract.

1976

Table 1. Marine Mammal Sightings, Townsend Cromwell - Cruise 68

Date	Position	Mammal*	Number
9 Jan.	11°35'N; 146°33'W	Unidentified Large Whale	2±1
9 Jan.	11°35'N; 146°33'W	Stenella longirostris	500±200
10 Jan.	09°50'N; 144°15'W	Unid. Large Whale	1
10 Jan.	09°46'N; 143°51'W	Balaenoptera physalus	2±1
13 Jan.	05°00'N; 138°24'W	Unid. Medium Whale	1
13 Jan.	04°48'N; 138°15'W	Unid. Small Whale	1
14 Jan.	01°25'N; 137°42'W	Orcinus orca	2
19 Jan.	00°00' ; 125°12'W	Pseudorca crassidens	20±10
19 Jan.	00°00' ; 125°12'W	Unid. Large Baleen Whale	1
20 Jan.	00°17'N; 122°45'W	Unid. Large Whale	2±1
20 Jan.	00°22'N; 122°13'W	Unid. Small Whale	2
20 Jan.	00°27'N; 120°55'W	Balaenoptera borealis	2
21 Jan.	00°00'N; 118°41'W	Unid. Large Whale	1
22 Jan.	02°25'S; 116°09'W	Globicephala macrorhyncus	15±5
22 Jan.	03°20'S; 115°29'W	Physeter catodon	3±1
23 Jan.	04°03'S; 113°15'W	Stenella longirostris	500±200
23 Jan.	03°47'S; 112°40'W	Stenella longirostris + Stenella attenuata	2000±500
25 Jan.	00°49'N; 107°30'W	Stenella coeruleoalba	75±25
25 Jan.	00°40'N; 106°55'W	Stenella coeruleoalba	75±25
25 Jan.	00°38'N; 106°45'W	Delphinus delphis	125±25
25 Jan.	00°37'N; 106°44'W	Balaenoptera physalus/borealis	2

Marine Mammal Platforms of Opportunity

Page 1 of 1 Date Submitted for keypunching _____

Logged by P. McGuire, Date _____

Checked by _____, Date _____

year	mo.	day	hour	min.	Deg.	Min.	N/S	Deg.	Min.	E/W	Species	Reliability	Confidence Interval	Number Animals	Group Size	N/S Direction E/W Headed	Behavior Code	Port P/Stbd S Points 1pt=90°	Initial Distance in tens of meters eg. 1=10 meters	Visibility Code	Water Surface Temperature +/- C°	Platform Type	Platform ID	Time Zone GMT +/-?	Flag Column	TEXT
76	01	09			11	35	N	146	33	W	UZ		1	2			01					1014		10	
		09			11	35		146	33		SL		7	500										10	
		10			09	50		144	15		UZ		0	12										10	
		10			09	46		143	51		BP		1	2										10	
		13			05	00		138	24		UW		0	1										7	
		13			04	48		138	15		UX		0	1										9	
		14			01	25		137	42		UO		0	1										9	
		19			00	00		125	12		PC		0	4		2								8	BALEEN WHALE
		20			00	00		125	12		UZ		0	1		0								8	
		20			00	17	N	122	45		UZ		0	1		1								8	
		21			00	22	N	122	13		UX		0	1		2								8	
		22			00	27	N	120	55		BB		0	1		2								8	
		22			00	00		118	41		UZ		0	1		1								8	
		22			02	25	S	116	09		GM		0	3		1								8	
		22			03	20	S	115	29		PM		1	7		5								8	
		23			04	03	S	113	15		SL		7	500			01							8	
		23			03	47	S	112	40		SL		7	100			12							8	
		23			03	47	S	112	40		SA		7	110			11							8	
		25			00	49	N	107	30		SC		5	7		5	01							7	
		25			00	40	N	106	55		SC		5	7		5	01							7	
		25			00	38	N	106	45		DD		5	1		2	01							7	BP OR BB
76	01	25			00	37	N	106	44	W	UZ		0	2			01					1014		7	

Appendix-Field Format Example 5.

These are marine mammal sightings compiled by U.S. Forest Service naturalists aboard Alaska State Ferries. Sightings of less common species that do not have additional notes are either marked as tentative identifications or discarded. These forms have been abstracted from the Forest Service before transmission to Marine Mammal Division and are not raw field data.

USDA Forest Service MARINE HIGHWAY MARINE MAMMAL SURVEY

VESSEL _____ TRIP DATES _____ NATURALIST _____

Date	Time	Location Lat. Long.	Identification Species	Pos.	Np.	Numbers Pos.	Np.	Conditions: Weather, unusual behavior, activity (resting, playing, feeding, family group,...)	Observer
07-26-76	1730	58°27'N 134°26'W	Humpback Whale	✓		2		announced by bridge saw one breach in wake of ship-leaped twice ½ body exposed slight	Daugherty
								roll to show left pectoral fin second animal dived	
	1940	58°20'N 134°25'W	Humpback Whale	✓		2		announced by bridge moving south	
07-27-76	0600	57°33'N 133°40'W	Humpback Whale	✓			2-3	low clouds and fog limit vision about and flukes clearly visible	Loken
	0625	57°35'N 133°43'W	Humpback Whale	✓		1		breached several times pectoral fins clearly white	
	0630	57°39'N 133°43'W	Humpback Whale	✓		2		very close to ship generally moving south	
	1245	58°17'N 134°43'W	Harbor Seal		✓		1	low overcast w/rain round face only once	
	1343	58°33'N 134°55'W	Dall porpoise	✓		2		overcast sighted characteristic "rooster tail"	
	1505	57°00'N 135°12'W	Dall porpoise	✓			8-12	medium overcast moving south	
07-28-76	0800 -0900	57°29'N 133°35'W	Humpback Whale		✓		2-3	reported by passengers and crew	Blau
	0800 -0900	57°26'N 133°35'W	Killer Whale		✓		2-5	reported by passengers and crew	
	1405	58°58'N 135°08'W	Dall porpoise	✓		3		clear and sunny	Searby
	1930	56°16'N 132°37'W	Killer Whale	✓		2			Thrasher
07-29-76	0900	57°18'N 133°31'W	Humpback Whale	✓		3		Sunny Breaching and spouting	Searby
	0925	57°15'N 133°37'W	Humpback Whale	✓		2			
07-30-76	0915	57°20'N 133°43'W	Humpback Whale	✓		3		saw only spouts	Daugherty

Marine Mammal Platforms of Opportunity Page 1 of 1 Date Submitted for keypunching 15 Sept. 1976

Logged by R. Mercer, Date 10 Sept. 1976

Checked by _____, Date _____

year mo. day	hour min.	Deg.	Min.	N/S	Deg.	Min.	E/W	Species	Reliability	Confidence Interval	Number Animals	Group Size	N/S Direction E/W Headed	Behavior Code	Port P/Stbd S Points 1pt=90°	Initial Distance in tens of meters eg. 1=10 meters	Visibility Code	Water Surface Temperature +/- C°	Platform Type	Platform ID	Time Zone GMT +/-?	Flag Column	TEXT
76 07 26	1930	58	23	N	134	26	W	MN		0	2			28									1 BREACHED
26	1940	58	20		134	25		MN		0	2		S	01									
27	0600	57	33		133	40		MN		0	3			01									
	0623	57	35		133	43		MN		0	1			28									WHITE PECTORALS
	0630	57	39		133	43		MN		0	2		S	01									
	1245	58	17		134	43		PV	T	0	1			01									
	1343	58	33		134	55		PD		0	1	2		01									
27	1505	59	00		135	12		PD		0	2	1	S	01									
28	0830	57	25		133	35		MN	T	2	2	1		01									
	0830	57	25		133	35		OO	T	2	2			01									
	1405	58	58		135	08		PD		0	2			01									
28	1930	56	16		132	37		OO		0	0			01									
29	0900	57	18		133	31		MN		0	3			28									
29	0925	57	15		133	37		MN		0	2			01									
30	0915	57	20		133	43		MN	T	0	3			01									

Appendix - Field Format Example 6.

Marine Observation Reports are filled out by participating U.S. Coast Guard vessels and routed through: Commander
U.S. Coast Guard
630 Sansome Street
San Francisco, California 94126

to the Marine Mammal Platforms of Opportunity Project (POP) Officer. Sightings are recorded in local time with no fix or position given. The latitude and longitude of each sighting are interpolated from the beginning and end of watch (four hour watches) positions provided. Since the instructions are not specific, it cannot be assumed that the vessel travelled a straight, constant speed course during each watch; consequently, all U.S. Coast Guard marine mammal sighting positions should be considered approximate within a 20 mile radius. Due to the condensed format, identifications of animals cannot be accompanied with notes or illustrations and sightings of rare or uncommon species are not considered reliable.

The Coast Guard has now adopted the POP Marine Mammal Logbook and it is hoped that future data will be better documented.

Entries taken from the Marine Observation Report (MOR) for transcription into the POP format have been circled on the MOR.

U.S. NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D.C. 20373

MARINE OBSERVATION REPORT

UNITED STATES COAST GUARD/UNITED STATES NAVAL OCEANOGRAPHIC OFFICE

(For legibility please print)

SHIP (Name) USCGC BOUTWELL (WHEC 719) | CAPTAIN CAPT. J.C. Guthrie | ADDRESS FPO SEATTLE WA 98759 | DATE 23 APR 75

VOYAGE FROM Kodiak AK | DATE 14 APR 75 | TO Adak Alaska

OBSERVER 12-4 WATCH (NAME AND RANK) Ens. M.E. Saylor | OBSERVER 4-8 WATCH (NAME AND RANK) Lthg P.L. Thompson | OBSERVER 8-12 WATCH (NAME AND RANK) CDVO S.L. HARBIN

The U.S. Naval Oceanographic Office is investigating the distribution of whales and other marine animals which are responsible for sonar classification problems. Marine life data are being recorded by personnel aboard U.S. ships and aircraft. The sustained data collection effort by your ship is an invaluable input to this program. Each watch should complete this form over to the column marked "No sighting." The columns to the right of this need be filled in only when marine life has been observed. (Note, a separate line should be used for each observation.) Use the Remarks Column to describe characteristics, such as: color, shape of tail or fins, form of blow, swimming or diving behavior, or any features or conditions observed which seem significant. Enter approximate position at time of observation, if possible. Also under remarks, report algae, bioluminescence, plankton blooms (discolored water), and oil spills, giving the area covered (approximate area in yards) and color. Watch should be maintained while on ocean stations, however, identical position data need not be repeated.

POSITION AND EFFORT DATA

	DAY	MONTH	WATCH (X) 0000-0400	0400-0800	0800-1200	1200-1600	1600-2000	2000-2400	FROM POSITION LAT. (N/S) Deg	Min	LONG. (E/W) Deg	Min	TO POSITION LAT. (N/S) Deg	Min	LONG. (E/W) Deg	Min	DISTANCE SAILED (NM)	AVERAGE VISIBILITY (miles)	NO SIGHTING (✓)
1	14	4			X				57	55	152	50	57	41	152	07			
2						X			57	26	154	28	57	25	151	29.5	55	3.0	✓
3							X		57	25	151	33.5	56	135	151	46.0	39	0.5	✓
4	15	4	X						56	14	151	46	56	35	152	41	37	5	✓
5				X					56	25	152	41	56	10	153	33	40	5	✓
6					X				56	10	153	33	55	49	153	00	40	5	✓
7						X			55	49	155	00	55	47	155	56	40	0.5	✓
8							X		55	17	155	56	—	—	—	—	—	0.5	
9							X		—	—	—	—	55	29	156	28	30	0.5	
10								X	55	57	156	32	55	00	157	20	35	2.0	
11	16	4	X						55	00	157	20	54	47	156	14	40	3	—
12				X					54	47	154	14	54	12	160	53	39	UNR	✓
13					X				54	24	154	15	54	25 / 22	154 / 159	50 / 50	40	UNR	✓

OBSERVATION

TIME (LOCAL)	WHALE	PORPOISE	FISH SCHOOL	FISH (Or less)	SHARK-RAY	NUMBER	SIZE (feet)	DISTANCE FROM SHIP (nearest tenths)	DIRECTION SWIMMING (degrees)	REMARKS
0845	X	X				6	8	0.2	120	2) SCHOOL OF 3 KILLER WHALES AND APPROX 3-4 ARMIES 6 SEALS
								0.2		
1725						5		0.2		5 SEALS
1920						1		0.1	310	SEAL
2005	✓					3	5	0.3	340	

91

Marine Mammal Platforms of Opportunity Page 1 of 1 Date Submitted for keypunching

Logged by P McGuire, Date

Checked by, Date

year	mo.	day	hour	min.	Deg.	Min.	N/S	Deg.	Min.	E/W	Species	Reliability Confidence Interval	Number Animals	Group Size	N/S Direction E/W Headed	Behavior Code	Port P/Stbd S Points 1pt=90°	Initial Distance in tens of meters eg. 1=10 meters	Visibility Code	Water Surface Temperature +/- C°	Platform Type	Platform ID	Time Zone GMT +/-?	Flag Column	TEXT
75	04	15	0845		56	06	N	153	50	W	00	0	3			01					1303		10		
			0845		56	06		153	50		UD	1	3			01									
			0845		56	06		153	50		UP	10	6			01									
			1725		55	39		156	095		UP	00	5			01									
			1920		55	30		156	26		UP	00	1		NW	01									
75	04	15	2005		55	26	N	156	33	W	UD	0	3		SW	01					1303		10		

```
10 INPUT "ENTER MAXIMUM NET REPRODUCTIVE RATE (.04,.02)";RMAX
INPUT "ENTER NUMBER OF YEARS TO BE CALCULATED";YEARS%
INPUT "ENTER YEAR OF INITIAL EXPLOITATION";YEAR%
INPUT "ENTER STOCK ESTIMATE FOR 1979";STOCK79
INPUT "ENTER FUNCTION FOR REPRATE RELATIONSHIP(3.5,6,11.5)";Z
LPRINTER
PRINT"THIS PROGRAM ITERATES TO OBTAIN ESTIMATES OF PORPOISE STOCK"
PRINT"FOR THE FOLLOWING SERIES OF CONDITIONS"
PRINT
PRINT "RMAX=";RMAX;",START YEAR";YEAR%;",1979 STOCK";STOCK79;",Z";Z
PRINT
PRINT"PROGRAM ESTIMATES STOCKS FOR LISTED SERIES OF YEARS"
PRINT
DIM KILL(YEARS%+1),STOCK(YEARS%+1),REPRATE(YEARS%+1)
STOCK =1.5*STOCK79

50 STOCK(1)=STOCK
     FOR A%=1 TO YEARS%
     READ KILL(A%)
     GOSUB 100
     STOCK(A%+1)=(STOCK(A%)-(.5*KILL(A%)))*(1+REPRATE(A%))-(.5*KILL(A%))

     YEAR%=YEAR%+1
     NEXT A%
COMPARE=STOCK(A%)/STOCK79
PRINT"RELATIONSHIP TO 1979";STOCK(A%),STOCK79,COMPARE

YEAR%=YEAR%-YEARS%

IF COMPARE <.99999 THEN 200
IF COMPARE >1.00001 THEN 200
     PRINT
     PRINT"YEAR","STOCK(A%)","KILL(A%)","REPRATE(A%)"
     PRINT
     FOR A%=1 TO YEARS%
     PRINT YEAR%,STOCK(A%),KILL(A%),REPRATE(A%)
     YEAR%=YEAR%+1
     NEXT A%
DATA 52327,288566,365586,158742,171417,276000,325208
DATA 192279,188717,171364,340437,371328,184326,298153
DATA 149645,95643,107940,70417,22928,20279
RESTORE
INPUT "DO YOU WISH TO CONTINUE?";YES$
IF YES$="YES" THEN 10
PRINT
PRINT
STOP
100 REPRATE(A%)=RMAX*(1-(STOCK(A%)/STOCK)^Z)
RETURN
200 STOCK=STOCK+.75*(STOCK79-STOCK(A%))
RESTORE
GOTO 50
A>
```

6%

1959

1978

1952 - 1978

27 YRS

~~D Jacquard~~

1979 - boost survey

WHAT is spoalcs PDT - 1978

Chris Bouchet

Karen

Questions

1. How were perpendicular distances calculated & are they given.
2. Where is the effort in miles travelled.
3. How are points related precisely to angles?

1 — 0
2 — 11.25
3 — 22.50
4 — 33.75
5 — 45.00
6 — 56.25
7 — 67.50
8 — 78.75
9 — 90.00

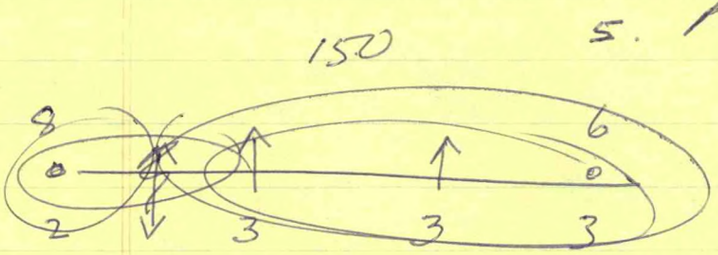
4 = 45
8 = 90

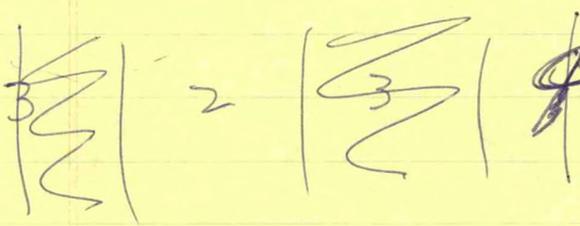
11.25 ½ 0
11.25

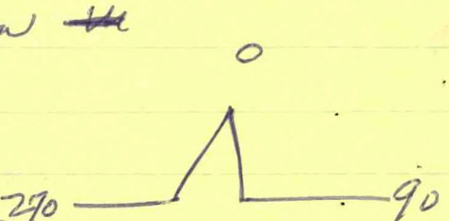
51.25
62.50
73.75
85.00

unidentified
Trail

4. Species Px + PT
5. Page 24 of 70 page Synopsis or prin paper.







47-48 10 of degrees S

— Beginning & end join —

74-75 76-77-78

78 — Wind Speed x Direction SW Center.

79

1978-

64-65	Series #	
66-67	Leg #	
69-71	∠ Bow	
72-73	Obs. Code	
74-75	Wind Speed Kts.	
76-78	Direction	
80	Sighting Cue	

.02 - .22

50-60-70

N = Exponent.

R = $R_0 - (R_0 - N)^{N/N_1}$

$N_1 = CT + R - N * N_1 - CT/2$

EXP

Curvilinear Allens Book pg

1979-

64-67	Time of last sighting
68-69	Vis Km.
70-71	Weather code (Japanese Data Deck)
72	Beaufort
73-75	Wind Direction (Gauge on boat?)

2/1

Hoyo Maru 67 1979

EXP polynomial

Japanese sighting fall off very rapidly.