



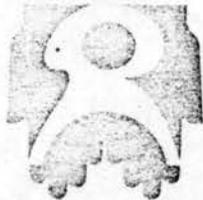
Minnesota State Zoological Board.
Zoo-Related Organizations Files.

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International Species Inventory System



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

A Program of the American Association
of Zoological Parks and Aquariums

1981 ANNUAL REPORT
of the
INTERNATIONAL SPECIES INVENTORY SYSTEM (ISIS)

10 August 1981

Nathan R. Flesness
ISIS Project Director

Edward Kohn
General Director
Minnesota Zoological Garden

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

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ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

INTRODUCTION

This ISIS Annual Report for Fiscal Year 1981 covers the period from 1 July 1980 through 30 June 1981, the Fiscal Year of the State of Minnesota, which provides accounting services to ISIS. Like preceding annual reports, this document will cover major events of the year, finances and participation.

FY 1981 included important developments in the ISIS data base, in better and clearer relationships with supporting organizations, in real growth of participation, and in continued overall solvency. ISIS staffing remained at four full-time equivalent positions, a part-time (overload) extra data entry operator, and a part-time (contract) systems design/analysis/programmer consultant.

We are very pleased to be able to report another good year for ISIS, and hopefully therefore a better year for the institutions it serves.

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

SIGNIFICANT EVENTS OF THE YEAR

September 1980	AAZPA increases grant support to \$30,000 for ISIS fiscal year 1982.
October 1980	AAZV increases grant support to \$10,000 for ISIS fiscal year 1981.
December 1980	Actual programming starts on ISIS overhaul, after eleven months of systems design and analysis.
January 1981	Karen Sausman, Chair of AAZPA's ISIS Management Committee and committee members Palmer Krantz III, Dr. George Rabb, and Edward Kohn convene with Nate Flesness, ISIS Project Director, to assist in formalizing AAZPA-ISIS relationships.
February 1981	Distribution of the ISIS Species Distribution Report on Feb. 13, more currently than ever before.
April 1981	Distribution of second edition of ISIS Institution Directory, with laser-printed improved format.
May 1981	Peak activity by AAZPA's ISIS Liaison Committee in review and revision of proposed overhaul changes to reports and data flow.
June 1981	Interagency Primate Steering Committee meetings held. ISIS contract renewed, with supplemental funding for additional data assembly on great apes and development of the linkage-inference program "SHERLOCK".
June 1981	First test of input and output of new ISIS data base.

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

SIGNIFICANT EVENTS OF THE YEAR

Although it is only beginning to be visible to users, the dominant event of the year was a sustained analysis and redesign of the ISIS computer system. Under development grants from the Institute of Museum Services, U.S. Dept. of Education, ISIS has taken the steps necessary to build a system capable of supporting the extensive biological analysis needed for successful long-term captive conservation programs such as the AAZPA's Species Survival Plan (SSP). In addition, the new system offers greater flexibility, better computer economy, and can provide real support and communication to within-institution computer systems. Such systems are under active development in more than half a dozen participant institutions, and are expected soon in many more.

This "overhaul" comes after eight years of experience operating the original system; it has required a detailed examination of the purposes of the ISIS system, the needs of participants and their associations, and the limited economic resources which are expected to be available to support operations. In short, a rethinking of the what, why and how of ISIS.

As part of the overhaul, several ISIS capabilities have had to be reinvented. For example, the original computer software and hardware used to publish the ISIS directory volumes was made available as donated services during the period 1973-1977. By 1980, these original editions were becoming obsolete, but ISIS had no means of publishing updated editions. During FY 1981, as part of the overhaul, new edit and printing programs were developed and used to publish the second edition of the ISIS World Geographic and Zoological Institution Directory. Similar work on the taxonomic directories is now underway.

During the year, many questions have arisen concerning zoo records, information flow, data security, data accuracy, data forms, error handling, and better report formats. The AAZPA's ISIS Liaison committee has served effectively to represent the great majority of ISIS users in providing advice as to resolution of these questions. As successive points were identified, the committee chair (Judith Block) distributed questionnaires to the Liaison Committee to determine their wishes. Collated responses were returned to ISIS by the committee chair. In all cases where a clear majority existed, their views were followed; in the one or two ambiguous cases, flexibility was built in so that experience can determine the best answer later.

As the fiscal year ended (30 June 1981), the new system had just received first testing - loading test data, editing it, creating a test data base, and extracting information for reports. The original operational date was forecast to be June 1981, 20 months after work began. We are behind schedule, but not seriously so, with operations now forecast for September (23 months after starting development).

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

FORTHCOMING EVENTS

A very major forthcoming event is the conversion to the new data base. Over 300,000 transactions from the old system will be put into the new overhauled system; the volume of error messages that will be produced by the new, more strict edit programs is expected to be very substantial. These data problems will be referred, in acceptable doses, to the institutions concerned.

To make maximum use of the data already collected, it is important that animals generally be traceable from institution to institution, in spite of different specimen identification numbers, and occasionally change in subspecies or even species. This matching and tracing is called linking. Two specific routines will be used to "link" as much of the older data as possible. One routine is a multiple "alias" table in which matches of tattoo, studbook number, house name, etc. can be noticed. The other routine, already funded by the IAPSC chimpanzee project contract, is a program "SHERLOCK" which will make links based on strong inference and coincidence. All links inferred will be reported to the institutions concerned for their information, and in case they have reason to corroborate or falsify the inference.

With the new system running, we will have at long last a base for genetic, demographic, and other biological reports of interest. The next challenge is to acquire or write programs to provide the analytical capabilities needed. Some suitable programs are in hand, others will require development.

A provisional list of technical analyses needed by the AAZPA's SSP program has been reviewed and found to be within the potential capabilities of the new overhauled system (the old system could not possibly support such scientific analysis). Construction of the new system, begun in late 1979, was motivated largely by anticipated needs of this type. To deliver such reports, development must be sustained (or speeded up) in spite of the apparent end of the IMS grant program.

Several other reports, beyond SSP needs, are also planned for development. These reports would increase the short-term benefits to institutions which participate - for example, provide them with a computer-generated IZY annual questionnaire, saving considerable clerical time and thus making the participation fee a better bargain.

Another forthcoming event is distribution of review copies of the ISIS taxonomic directories for amphibians and reptiles, reconciliation of reviewer's comments, and operational status for these additional classes of vertebrates. Assembly of the information for amphibians is now finished, and will shortly be so for reptiles. The programs to laser-print the new directories (and permit republication of the older mammals and birds volumes) are now being written in the same fashion as those recently used to publish the institution directory, second edition. Further changes in the ISIS Taxonomic Directories are anticipated as soon as the Association for

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

FORTHCOMING EVENTS

Systematics Collections publishes it's new Mammals of the World. This list is to be adopted by national and international regulatory agencies, and is the product of more than 140 taxonomic reviewers. Discussions with A.S.C. staff have been held, some basis for constructive two-way interaction established, and it is anticipated that ISIS may adopt their taxonomy to the species level after it's publication and review by ISIS Liaison Committees.

The now long awaited second ISIS Physiological Norms report is expected to be distributed to pilot project participants during this August, under a grant from the AAZV. At the fall AAZV meeting, further review of the laboratory data form and discussion of appropriate report formats and statistics is planned. Discussion of moving this program from pilot project status to full operation will also occur, along with plans for cost recovery.

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

FINANCIAL STATEMENT FOR FY 1981

Fiscal Year 1981 (1 July 1980 to 30 June 1981)

BALANCE ON HAND AS OF 1 JULY 1980.....\$ 14,102

RECEIPTS;

Late participation fees from 1978	\$ 859
Late participation fees from 1979	\$ 6,047
Participation fees from 1980	\$45,239
Advance payments for 1981	\$ 300
AAZPA Grant	\$20,000
AAZV Grant	\$10,000
Chimpanzee Project Contract	\$14,000
IMS Grant	\$30,000
Optional Reports and Misc.	\$ 2,830
Donations	\$ 2,500

Total Receipts \$131,775

OBLIGATIONS:

Data acquisition/entry	\$48,155
Report production	\$10,000
Education/Recruitment	\$10,000
Development	\$22,500
Special contract obligations	\$14,000
Equipment	\$11,581
Overhead	\$ 6,177

Total Obligations \$122,143

BALANCE ON HAND AS OF 1 July 1981.....\$23,734*

* This carryover to the next fiscal year does not constitute "profit". It is a cash flow derivative, in that ISIS does not receive participation fees until the last quarter of the fiscal year. Expenditures during the first three-quarters are dependent on carryover plus any non-fee income.

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

PROJECTED FINANCES FOR FY 1982

Fiscal Year 1982 (1 July 1981 to 30 June 1982)

BALANCE ON HAND AS OF 1 JULY 1981.....\$23,734

RECEIPTS:

Late participation fees from 1981	\$ 2,000	
Participation fees from 1982	\$48,000	
Advance payments for 1983	\$ 300	
AAZPA Grant	\$30,000	
AAZV Grant	\$10,000	
Chimpanzee project contract	\$42,000	
IMS Grant	?	(now unlikely)
Optional reports, misc.	\$3,000	
Donations	\$2,500	
Projected Total Receipts	\$137,800	

OBLIGATIONS:

Data acquisition/entry	\$55,000
Report production	\$12,000
Education/Recruitment	\$10,000
Development	\$27,300
Special contract obligations	\$20,000
Equipment	\$ 9,000
Overhead	\$ 6,000
Projected Total Obligations	\$137,800

ANTICIPATED BALANCE AS OF 1 JULY 1982.....\$23,734*

* This carryover to the next fiscal year does not constitute "profit". It is a cash flow derivative, in that ISIS does not receive participation fees until the last quarter of the fiscal year. Expenditures during the first three-quarters are dependent on carryover plus any non-fee income.

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

PROJECTED FINANCES FOR FY 1983

Fiscal Year 1983 (1 July 1982 to 30 June 1983)

BALANCE ON HAND AS OF 1 JULY 1982.....\$23,734

RECEIPTS:

Late participation fees from 1982	\$ 2,000
Participation fees from 1983	\$54,000**
Advance payments for 1984	\$ 300
AAZPA Grant	\$30,000**
AAZV Grant	\$10,000
Chimpanzee project contract	\$30,000
Optional reports, misc.	\$3,000
Donations	\$2,500

Projected Total Receipts \$131,800

OBLIGATIONS:

Data acquisition/entry	\$55,000
Report production	\$15,000
Education/Recruitment	\$10,000
Development	\$21,800
Special contract obligations	\$20,000
Equipment	\$ 3,000
Overhead	\$ 7,000

Projected Total Obligations \$131,800

ANTICIPATED BALANCE AS OF 1 JULY 1983.....\$23,734*

* This carryover to the next fiscal year does not constitute "profit". It is a cash flow derivative, in that ISIS does not receive participation fees until the last quarter of the fiscal year. Expenditures during the first three-quarters are dependent on carryover plus any non-fee income.

** Announcement of fee adjustment before 1 Jan. 1982 would change one or both of these projections.

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

DISCUSSION OF FINANCES

Fiscal Year 1981 was broadly typical of previous years. Participant fees made up about 40% of the budget, direct support from AAZPA and AAZV made up an additional 20%, and the remaining 40% came from contracts and grants from outside the zoological community. The combination of AAZPA-member participation fees plus AAZPA Board grants made up about 50% of the total budget.

These proportions are close to the average for all previous years; for example, AAZPA Board and membership support has amounted to slightly less than 50% of the total expenditures by ISIS since inception.

Budget expenditures were generally as predicted, except that a projected approximately \$10,000 overhead expenditure did not occur. The auditors of the State of Minnesota failed to request that the Minnesota Zoological Garden bill the ISIS program for the expected 6 or 7% administrative overhead; the MZG has chosen not to do so at this time.

Although financial resources for FY 1981 were adequate to sustain at modest pace a major overhaul of the ISIS system, the continued dependence on outside (soft) funding sources for 40% of the annual budget, including all developmental support, is unhealthy. Computerized information systems exist in a period of volatile technology change and fast-rising user expectations. A system that is not developing continuously is dead - and merely awaiting burial. As an example, the years 1977 - 1979 were the years with moderate or small non-zoo funding, and hence very little development; these years saw many institutions withdraw from participation as a result of a clear loss of momentum, contact, and future promise.

Long-term planning for ISIS must include establishment of an inherent capacity to develop. It is only by having sufficient resources to develop slightly ahead of within-zoo systems that it is reasonable to expect ISIS to continue to be the framework that unifies zoo record systems and hence our knowledge of populations of captive animals. This developmental lead was critical in the early 70's when ISIS began, allowing zoos to avoid the disaster of several non-compatible "national" systems (which befell the U.S. museum community). This developmental lead is again critical now, at a time when many zoos are investing 10 to 50 times their ISIS fees in development of in-house computerized animal record systems, which will need modern computer services and support from ISIS.

A key factor in ISIS finance is the participation fee. The fee has remained basically unchanged since 1974, which makes it a very rare item in a time of high inflation. U.S. Dept. of Commerce Price Index figures indicate that the 1981 \$1 fee is a 1975 \$.55 fee. If participation fees had tracked the Price Index, the fee today would be \$1.82. Such a figure would have raised \$85,000, approximately ISIS minimum operational survival budget. Instead, the fee has

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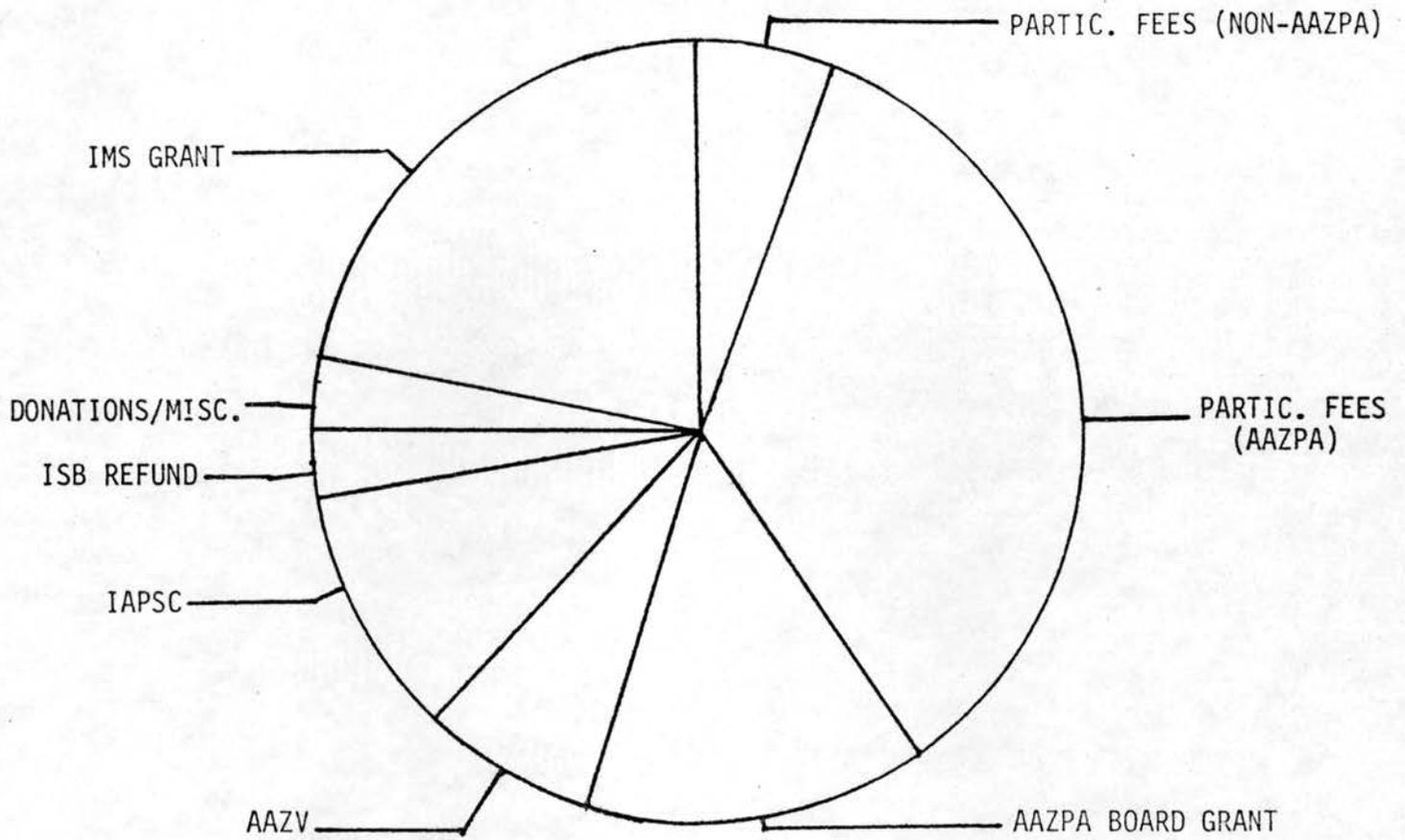
DISCUSSION OF FINANCES

remained \$1, AAZPA grant subsidies have become necessary to offset most of the loss on operations, and development funds continue to subsidize operations.

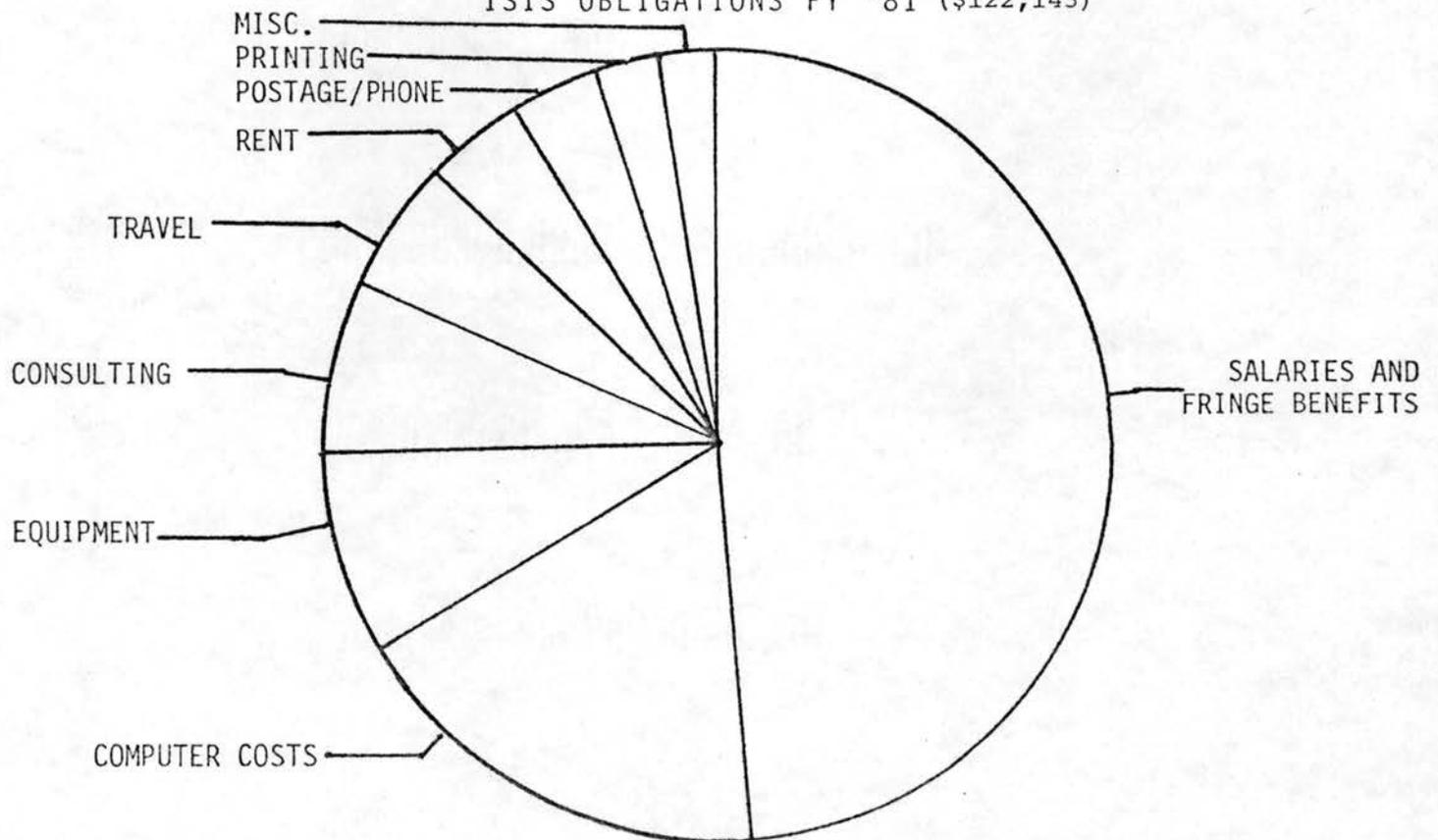
A fee adjustment is again proposed. Since ISIS bills after the year's services are provided, a fee adjustment has to be announced before the year begins in January, in order to be billed in the February 14 months later. An increase to \$1.40 is suggested for invoices to be sent out in February 1983. Though not a full inflation adjustment, this would stop the trend of erosion of the basic operational financial support item. Bringing participation fee income closer to minimum operational budget requirements would also permit the AAZPA to consider support of particular services instead of broad operations grants.

The following two pages are graphical explanations of ISIS income and expenditure, and the history of ISIS funding sources.

ISIS RECEIPTS FY '81 (\$131,775)

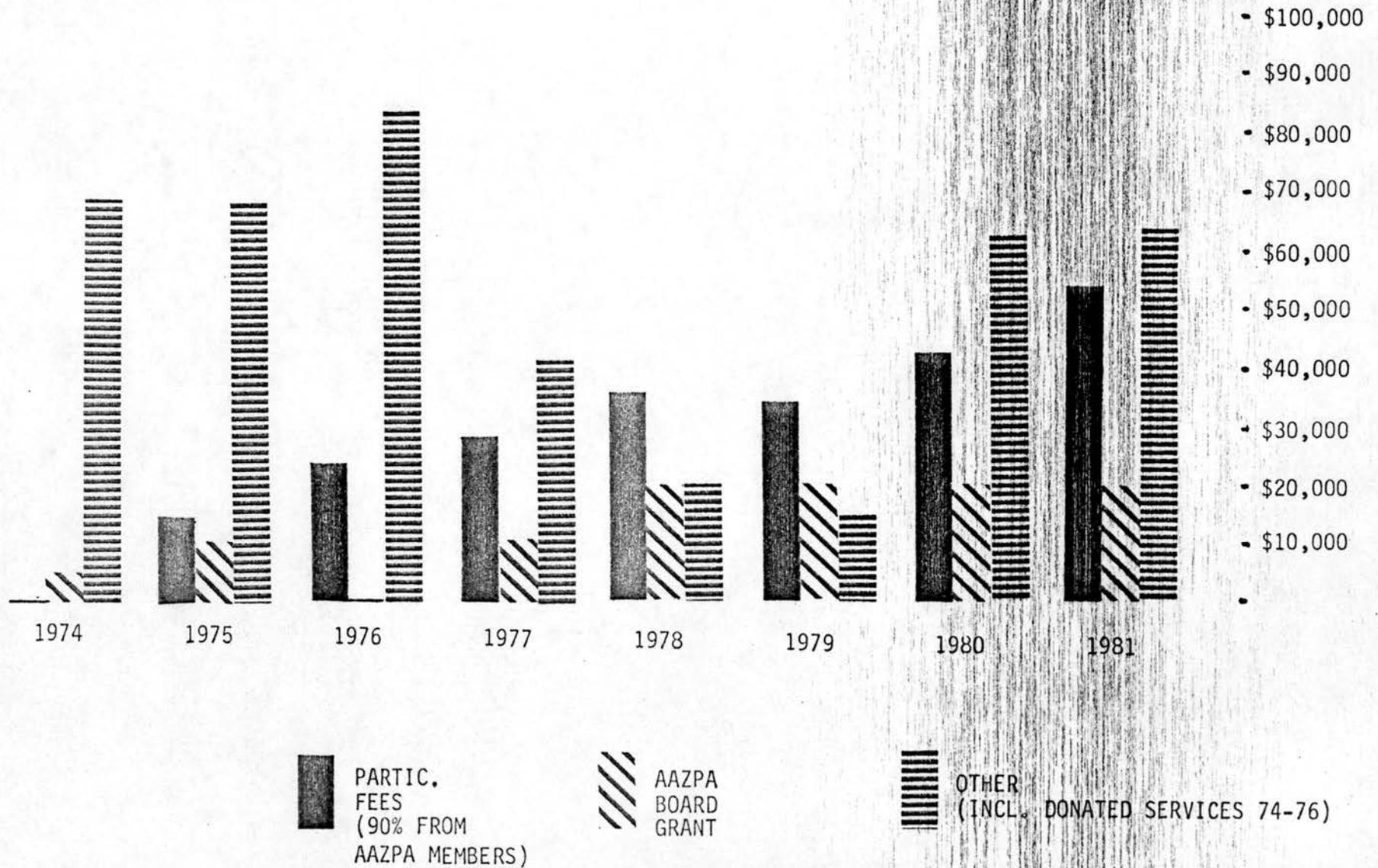


ISIS OBLIGATIONS FY '81 (\$122,143)



FINANCIAL SUPPORT OF THE ISIS PROGRAM: FY 74 TO DATE

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PARTICIPATION CHANGES

The following institutions began submitting data during FY 1981:

Yerkes Regional Primate Center, Atlanta, Georgia, USA
Louisiana Purchase Gardens and Zoo, Monroe, Louisiana, USA
Micki Grove Zoo, Lodi, California, USA
Phoenix Zoo, Phoenix, Arizona, USA
Oglebay's Good Zoo, Wheeling, West Virginia, USA
Emporia Zoo, Emporia, Kansas, USA
Vancouver Aquarium, Vancouver, British Columbia, CANADA
Wellington Zoo, Wellington, NEW ZEALAND
Helsinki Zoo, Helsinki, FINLAND

The following institutions have paid the registration fee but have not yet submitted data:

Moorepark Inst. for Wild and Exotic Animals, Moorepark, CA, USA
Discovery Place, Charlotte, North Carolina, USA
Northland Wildlife, Bovey, Minnesota, USA
Jardin Zoologico de Santa Fe, Medellin, COLUMBIA
Jardin Zoologico de Puerto Rico, Puerto Rico, USA

The following institutions are paying annual fees but failed to submit data during Fiscal Year 1981:

Arizona Sonora Desert Museum, Tucson, Arizona
Denver Zoological Garden, Denver, Colorado, USA
Henry Vilas Zoo, Madison, Wisconsin, USA
Houston Zoological Gardens, Houston, Texas
Kemper Zoological Park, Hattiesburg, Mississippi, USA
Montgomery Zoo, Montgomery, Alabama, USA
Racine Zoo, Racine, Wisconsin, USA
Salisbury zoo, Salisbury, Maryland, USA
St. Paul's Como Zoo, St. Paul, Minnesota, USA
Walt Disney World, Lake Buena Vista, Florida, USA

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

DISCUSSION OF PARTICIPATION

Fiscal Year 1981 was a very successful year in terms of participation. A record number of institutions actively submitted data (132 + 20 chimpanzee project participants), and the rate of increase of active institutions was the highest since ISIS originated (see following graph).

As has been the case in the past, many more institutions (132) participate with mammal data than with bird data (75). The AAZPA's ISIS Liaison Committee was provided a list of those participating only with mammals; contacts with these institutions have begun to encourage them to participate with birds also.

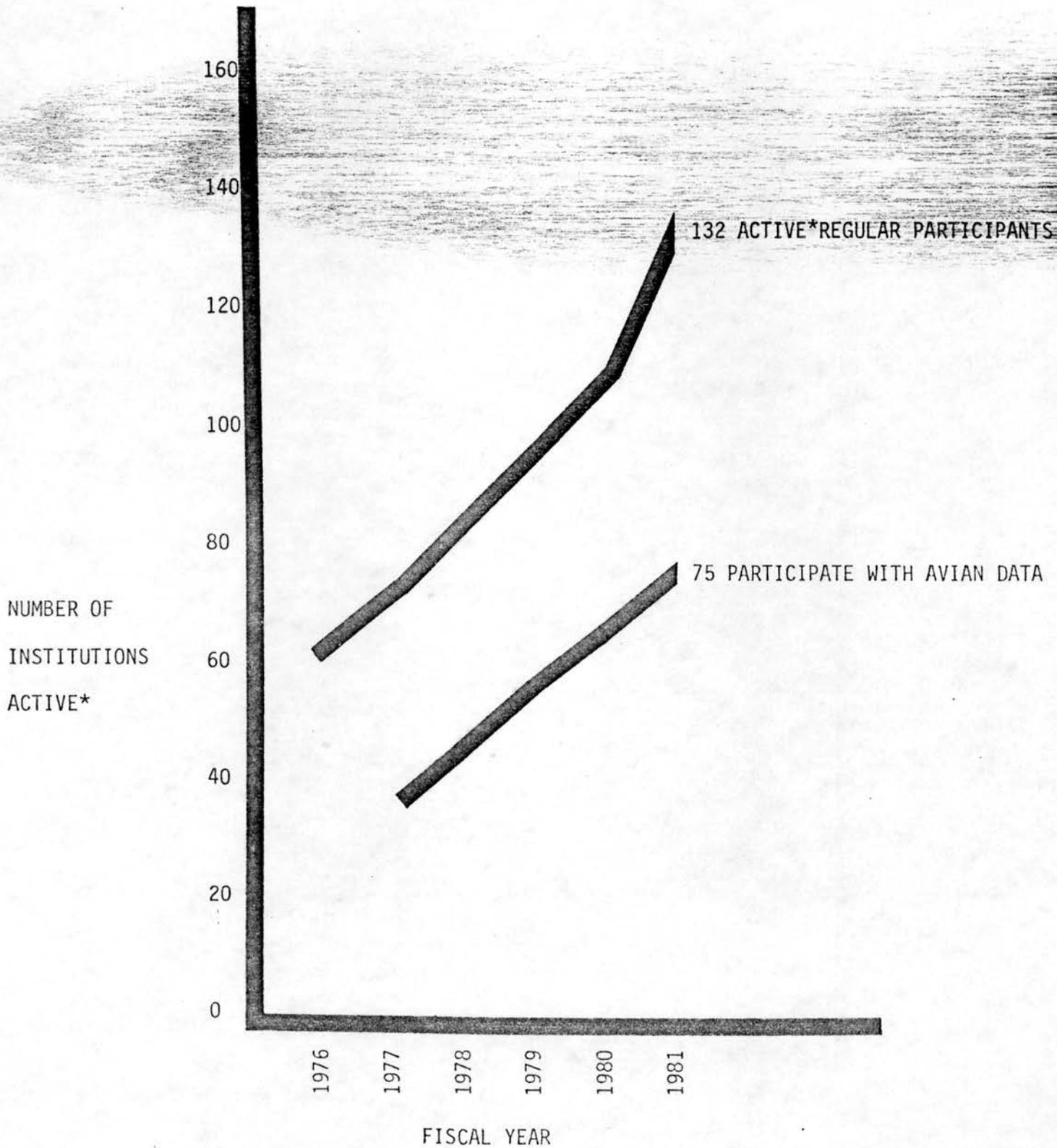
Two other indices of participation also showed continued growth. The number of living specimens on the ISIS system, now over 49,000, is rising at an appreciable rate (see graph on following pages). Also, the number of data forms submitted to the ISIS office each year continues to rise and is now reaching 40,000 per year (see graph on following pages).

Over the last two years a considerable change in contact with AAZPA member zoos has occurred. ISIS staff have given talks, workshops, and manned exhibits at five regional and two annual conferences of the AAZPA. In addition, members of the AAZPA's ISIS Liaison Committee have given talks and workshops at the other five regionals.

The results of the greatly extended personal contact are evident both in the number of active participants, and in the expanded understanding of the system shown by letters and phone calls coming into the ISIS office. Many institutions who made no use of the system are now frequently and knowledgeably using it to answer questions and solve problems, due in part to brief exposure to the systems products at a meeting.

It seems clear that this level of attendance at regionals was very useful, but also that it can be lowered somewhat. ISIS staff attending AAZPA regionals on an every other or every third year basis should suffice to retain the contact, so long as there is full and effective effort at the annual conference.

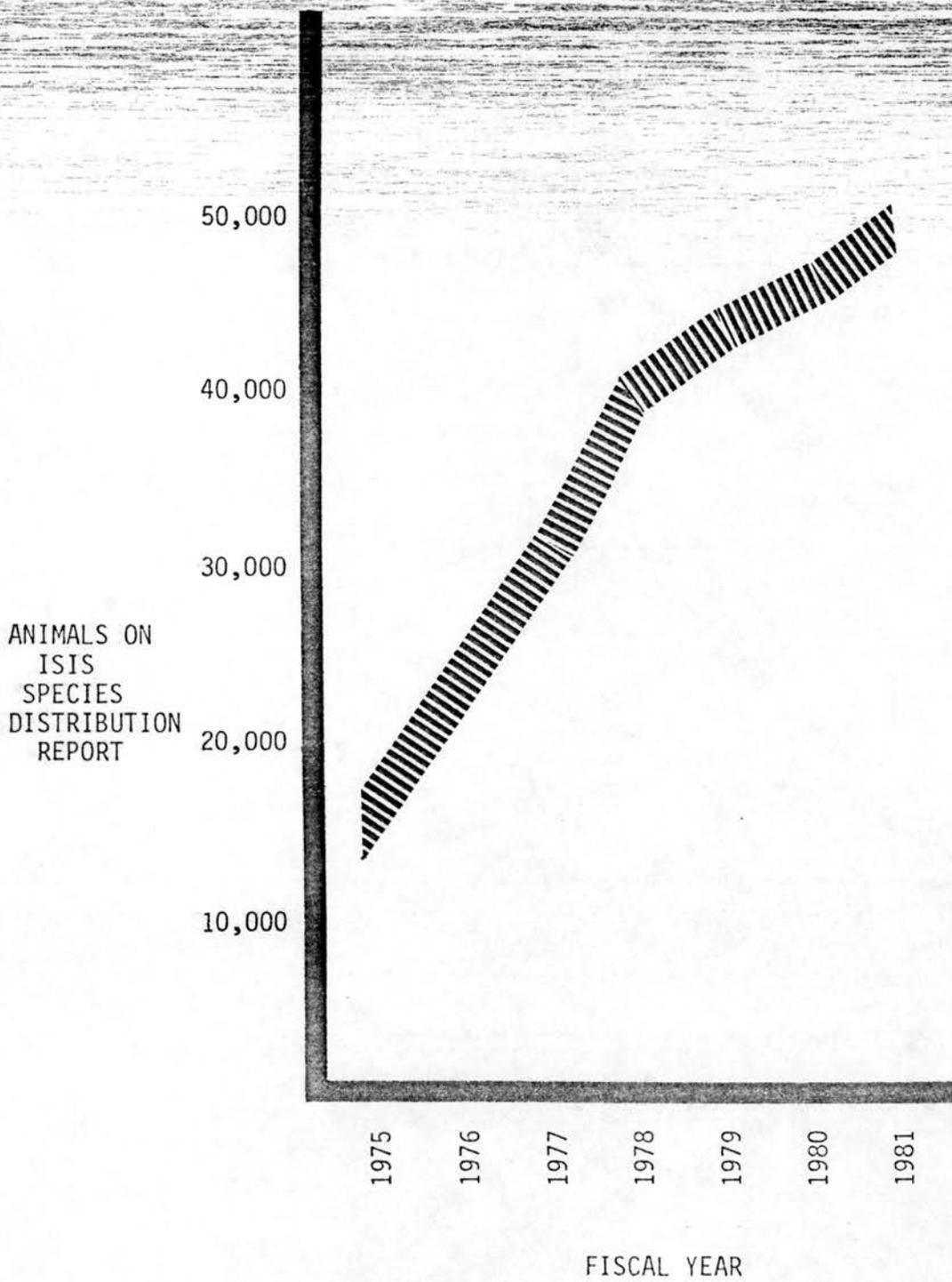
NUMBER OF INSTITUTIONS CONTRIBUTING DATA TO ISIS EACH YEAR
(FISCAL YEARS)



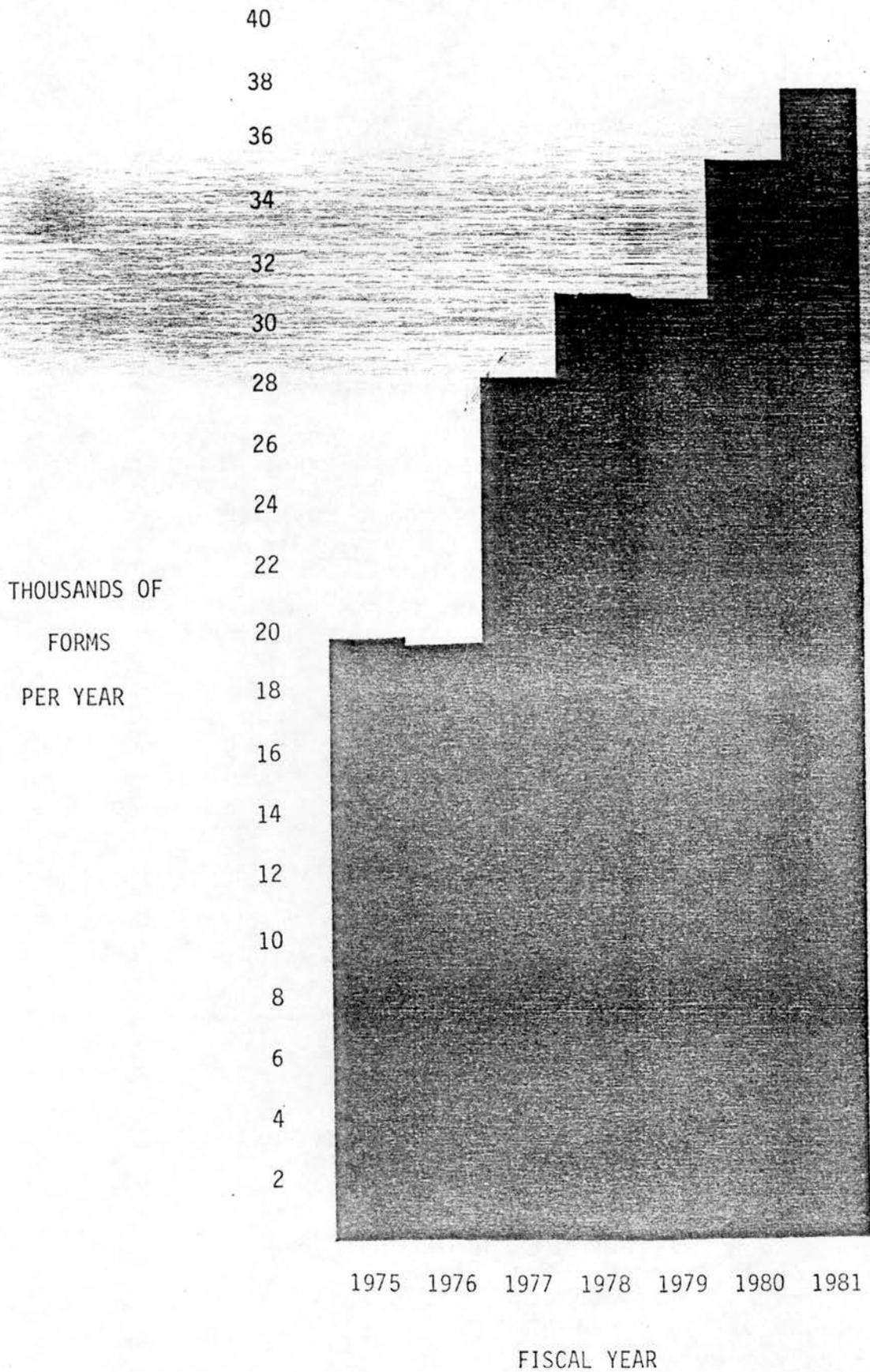
* 10 ADDITIONAL INSTITUTIONS PAY FEES AND HAVE SUBMITTED DATA - BUT FAILED TO DO SO DURING FISCAL YEAR 1981

20 ADDITIONAL INSTITUTIONS (NOT SHOWN) PARTICIPATE IN A SPECIAL CHIMPANZEE PROJECT

LIVING ANIMALS ON ISIS INVENTORY
BY FISCAL YEAR



DATA FORMS SUBMITTED TO ISIS



ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

ISIS PARTICIPANTS AS OF 1 JULY 1981

ABILENE ZOOLOGICAL GARDENS, ABILENE, TEXAS, USA
 AFRICAN LION SAFARI, ROCKTON, ONTARIO, CANADA
 ARKANSAS, ZOO OF, LITTLE ROCK, ARKANSAS, USA
 AZ SONORA DESERT MUSEUM, TUCSON, AZ, USA (MEX. WOLVES ONLY)
 AUDUBON PARK ZOO, NEW ORLEANS, LOUISIANA, USA
 BALTIMORE ZOO, BALTIMORE, MARYLAND, USA
 BIRMINGHAM ZOO, BIRMINGHAM, ALABAMA, USA
 BRADWOOD FARM, REDDICK, FLORIDA, USA
 BUFFALO ZOOLOGICAL GARDENS, BUFFALO, NEW YORK, USA
 BURGER'S DIERENPARK, SCHELMSEWEG 85, ARNHEM, NETHERLANDS
 BURNET PARK ZOO, SYRACUSE, NEW YORK, USA
 BUSCH GARDENS, TAMPA, FLORIDA, USA
 CALDWELL CHILDREN'S ZOO, TYLER, TEXAS, USA
 CALGARY ZOO AND NATURAL HISTORY PARK, CALGARY, ALBERTA, CANADA
 CAMP COOLEY RANCH, FRANKLIN, TEXAS, USA
 CANYON COLORADO EQUID SANCTUARY, COLORADO SPRINGS, COLORADO, USA
 CARLOS AVERY WILDLIFE MANAGEMENT AREA, FOREST LAKE, MINNESOTA, USA
 CEN-TEX ZOO, WACO, TEXAS, USA
 CHEYENNE MT. ZOO, COLORADO SPRINGS, COLORADO, USA
 CHICAGO ZOOLOGICAL PARK, BROOKFIELD, ILLINOIS, USA
 CINCINNATI, ZOOLOGICAL SOCIETY OF, CINCINNATI, OHIO, USA
 CLEVELAND METROPARKS ZOOLOGICAL PARK, CLEVELAND, OHIO, USA
 COLUMBUS ZOOLOGICAL GARDENS, POWELL, OHIO, USA
 COPENHAGEN ZOOLOGISK HAVE, COPENHAGEN, DENMARK
 DENVER ZOOLOGICAL GARDENS, DENVER, COLORADO, USA
 DETROIT ZOOLOGICAL PARK, ROYAL OAK, MICHIGAN, USA
 DICKERSON PARK ZOO, SPRINGFIELD, MISSOURI, USA
 DREHER PARK ZOOLOGICAL GARDEN, WEST PALM BEACH, FLORIDA, USA
 DUKE UNIVERSITY PRIMATE FACILITY, DURHAM, NORTH CAROLINA, USA
 DULUTH ZOO, DULUTH, MINNESOTA, USA
 EL PASO ZOOLOGICAL PARK, EL PASO, TEXAS, USA
 ELLEN TROUT PARK ZOO, LUFKIN, TEXAS, USA
 EMPORIA ZOO, EMPORIA, KANSAS, USA
 ENGESSER'S EXOTIC FELINES, CHIEFLAND, FLORIDA, USA
 ERIE ZOO, ERIE, PENNSYLVANIA, USA
 FORT WAYNE CHILDREN'S ZOOLOGICAL GARDENS, FORT WAYNE, INDIANA, USA
 FORT WORTH ZOOLOGICAL PARK, FORT WORTH, TEXAS, USA
 FRANKLIN CHILDREN'S ZOO, DORCHESTER, MASSACHUSETTS, USA
 FRANKLIN PARK ZOO, DORCHESTER, MASSACHUSETTS, USA
 GLADYS PORTER ZOO, BROWNSVILLE, TEXAS, USA
 GLEN OAK ZOO, PEORIA, ILLINOIS, USA
 GRANBY, SOCIETE ZOOLOGIQUE DE, GRANBY, QUEBEC, CANADA
 GREATER BATON ROUGE ZOO, BATON ROUGE, LOUISIANA, USA
 HAWTHORNE CIRCUS CORP., GRAYSLAKE, ILLINOIS, USA
 HELSINKI ZOO (KORKEASAAREN ELAINTARHA), HELSINKI, FINLAND
 HENRY DOORLY ZOO, OMAHA, NEBRASKA, USA
 HENRY VILAS PARK ZOO, MADISON, WISCONSIN, USA
 HIGHLAND PARK ZOO, PITTSBURGH, PENNSYLVANIA, USA
 HOUSTON ZOOLOGICAL GARDENS, HOUSTON, TEXAS, USA
 JACKSON ZOOLOGICAL PARK, JACKSON, MISSISSIPPI, USA
 INDIANAPOLIS ZOOLOGICAL PARK, INDIANAPOLIS, INDIANA, USA
 INTERNATIONAL CRANE FOUNDATION, BARABOO, WISCONSIN, USA

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

ISIS PARTICIPANTS AS OF 1 JULY 1981

JACKSON ZOOLOGICAL PARK, JACKSON, MISSISSIPPI, USA
JACKSONVILLE ZOOLOGICAL PARK AND SOCIETY, JACKSONVILLE, FLORIDA, USA
JERSEY WILDLIFE PRESERVATION TRUST, JERSEY, BRITISH ISLES
KAMPER ZOOLOGICAL PARK, HATTIESBURG, MISSISSIPPI, USA
KANSAS CITY ZOOLOGICAL GARDENS, KANSAS CITY, MISSOURI, USA
KINGS DOMINION (LION COUNTRY SAFARI), DOSWELL, VIRGINIA, USA
KINGS ISLAND, KINGS MILLS, OHIO, USA
KNOXVILLE ZOOLOGICAL PARK, KNOXVILLE, TENNESSEE, USA
LINCOLN CHILDREN'S ZOO, LINCOLN, NEBRASKA, USA
LINCOLN MUNICIPAL ZOO, LINCOLN, NEBRASKA, USA
LINCOLN PARK ZOO, CHICAGO, ILLINOIS, USA
LONDON, ZOOLOGICAL SOCIETY OF, REGENT'S PARK, LONDON NW1 4RY, ENGLAND
LONDON, ZOOLOGICAL SOCIETY OF, WHIPSNAD, ENGLAND
LOS ANGELES ZOO, LOS ANGELES, CALIFORNIA, USA
LOUISIANA PURCHASE ZOO, MONROE, LOUISIANA, USA
LOUISVILLE ZOOLOGICAL GARDEN, LOUISVILLE, KENTUCKY, USA
MARWELL ZOOLOGICAL GARDENS, WINCHESTER, ENGLAND
MESKER PARK ZOO, EVANSVILLE, INDIANA, USA
METRO TORONTO ZOO, WEST HILL, ONTARIO, CANADA
MICKE GROVE ZOOLOGICAL GARDENS, LODI, CALIFORNIA, USA
MILLER PARK ZOO, BLOOMINGTON, ILLINOIS, USA
MILWAUKEE COUNTY ZOO, MILWAUKEE, WISCONSIN, USA
MINNESOTA ZOOLOGICAL GARDEN, APPLE VALLEY, MINNESOTA, USA
MONTGOMERY ZOO, MONTGOMERY, ALABAMA, USA
NATIONAL ZOOLOGICAL PARK, WASHINGTON, D.C., USA
NATIONAL ZOOLOGICAL PARK DEPT. ZOOLOG. RESEARCH, WASH. D.C., USA
NATIONAL ZOOLOGICAL PARK CONSERV. CTR., FRONT ROYAL, VIRGINIA, USA
NATURAL SCIENCE CENTER, GREENSBORO, NORTH CAROLINA, USA
NEW ENGLAND AQUARIUM, BOSTON, MASSACHUSETTS, USA
NEW YORK ZOOLOGICAL SOCIETY, BRONX, NEW YORK, USA
NORTH CAROLINA ZOOLOGICAL PARK, ASHEBORO, NORTH CAROLINA, USA
OGLEBAY'S GOOD CHILDREN'S ZOO, WHEELING, WEST VIRGINIA, USA
OKLAHOMA CITY ZOO, OKLAHOMA CITY, OKLAHOMA, USA
PHILADELPHIA ZOOLOGICAL GARDEN, PHILADELPHIA, PENNSYLVANIA, USA
PHOENIX ZOO, PHOENIX, ARIZONA, USA
POINT DEFIANCE ZOO, POINT DEFIANCE PARK, TACOMA, WASHINGTON, USA
POTAWATOMI ZOO, SOUTH BEND, INDIANA, USA
QUEBEC, JARDIN ZOOLOGIQUE DE, CHARLESBOURG, QUEBEC, CANADA
RACINE ZOOLOGICAL PARK, RACINE, WISCONSIN, USA
RALPH MITCHELL ZOO, INDEPENDENCE, KANSAS, USA
RIO GRANDE ZOO, ALBUQUERQUE, NEW MEXICO, USA
RIVERBANKS ZOOLOGICAL PARK, COLUMBIA, SOUTH CAROLINA, USA
ROEDING PARK ZOO, FRESNO, CALIFORNIA, USA
ROGER WILLIAMS ZOO, PROVIDENCE, RHODE ISLAND, USA
ROOSEVELT PARK ZOO, MINOT, NORTH DAKOTA, USA
ROSS PARK ZOO (SOUTHERN TIER PARK), BINGHAMTON, NEW YORK, USA
ROTTERDAMSE DIERGAARDE, ROTTERDAM, NETHERLANDS
SACRAMENTO ZOO, SACRAMENTO, CALIFORNIA, USA
SALISBURY ZOO, SALISBURY, MARYLAND, USA
SALMONIER NATURE PARK, HOLYROOD, NEWFOUNDLAND, CANADA
SAN ANTONIO ZOOLOGICAL GARDENS, SAN ANTONIO, TEXAS, USA
SAN DIEGO WILD ANIMAL PARK, SAN DIEGO, CALIFORNIA, USA

ISIS ANNUAL REPORT FOR FISCAL YEAR 1981

ISIS PARTICIPANTS AS OF 1 JULY 1981

SAN DIEGO ZOOLOGICAL GARDENS, SAN DIEGO, CALIFORNIA, USA
SAN FRANCISCO ZOO, SAN FRANCISCO, CALIFORNIA, USA
SANTA BARBARA ZOOLOGICAL GARDENS, SANTA BARBARA, CALIFORNIA, USA
SANTA FE COMMUNITY COLLEGE TEACHING ZOO, GAINESVILLE FLORIDA, USA
SEDEGWICK COUNTY ZOO, WICHITA, KANSAS, USA
SENECA PARK ZOO, ROCHESTER, NEW YORK, USA
SHEDD (JOHN G.) AQUARIUM, CHICAGO, ILLINOIS, USA
ST. CATHERINE'S SURVIVAL CENTER, ST. CATHERINE'S ISL., GEORGIA, USA
ST. LOUIS ZOOLOGICAL PARK, ST. LOUIS, MISSOURI, USA
ST. PAUL'S COMO ZOO, ST. PAUL, MINNESOTA, USA
SUNSET ZOO, MANHATTAN, KANSAS, USA
THOMPSON, FRANK M., BRADENTON, FLORIDA, USA
TOPEKA ZOOLOGICAL PARK, TOPEKA, KANSAS, USA
TULSA ZOO, TULSA, OKLAHOMA, USA
TURTLE BACK ZOO, WEST ORANGE, NEW JERSEY, USA
UTICA ZOO, UTICA, NEW YORK, USA
VAN SAUN PARK ZOO, PARAMUS, NEW JERSEY, USA
VANCOUVER PUBLIC AQUARIUM, VANCOUVER, BRITISH COLUMBIA, CANADA
WALT DISNEY WORLD, LAKE BUENA VISTA, FLORIDA, USA
WALTER D. STONE ZOO, DORCHESTER, MASSACHUSETTS, USA
WASHINGTON PARK ZOO, PORTLAND, OREGON, USA
WILD CANID SURVIVAL AND RESEARCH CENTER, ST. LOUIS, MISSOURI, USA
WOLFSONG RETREAT, MEHOOPANY, PENNSYLVANIA, USA
WOODLAND PARK ZOOLOGICAL GARDENS, SEATTLE, WASHINGTON, USA
YERKES REGIONAL PRIMATE RESEARCH CENTER, ATLANTA, GA, USA
ZOOAMERICA, HERSHEY, PENNSYLVANIA, USA

ISIS

Ed Kahn
International Species Inventory System



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

21 August 1981

A Program of the American Association
of Zoological Parks and Aquariums

To: ISIS Management Committee of the AAZPA
Fm: Nate Flesness
Re: ISIS Annual Report

Enclosed is a copy of the FY 1981 ISIS Annual Report just provided to the Board and Officers of the AAZPA, along with a copy of the cover letter sent with the report.

As you will see from the report, it was an exceptionally good year in terms of the number of active participant institutions, and in terms of the volume of data submitted and processed. It was also financially successful, with sufficient developmental funds to permit reasonable progress on the overhaul as well as operation at a level that permitted the most rapid distribution of reports after deadlines ever achieved.

The year has also been a time for substantial investment of all of your time and energy toward a formal agreement between the AAZPA and the MZG concerning ISIS. I believe that a common goal has emerged, and a basic consensus on what the ISIS system ought to be, established. However, the hardest item, accepting the past, is as yet unfinished. I hope that New Orleans will see agreement on an agreement.

Looking forward to seeing you there,

Nate Flesness
ISIS Project Director

10 August 1981

AAZPA Board of Directors and Executive
Director Robert O. Wagner
AAZPA Executive Offices
Oglebay Park
Wheeling, WV 26003

Dear Sirs:

Enclosed is the ISIS Annual Report for Fiscal Year 1981. This report documents current and anticipated significant events, finances, and participation.

Over the last two years, success in raising developmental funds from outside the zoological community has permitted ISIS to make a considerable step forward. The overhauled ISIS system, now coming on-line, is more modern, efficient, and has greatly increased potential. In addition, the computer center which hosts the overhauled system can continue to be used by ISIS after ISIS leaves the administrative shelter of the State of Minnesota. Exploiting this new system will require developmental funds for programming.

In the past, a combination of user fees and AAZPA Board support has largely supported operational survival of ISIS. Development of new reports and other expanded services has always depended on raising funds elsewhere.

Now that AAZPA is formulating a list of explicit services needed from ISIS in support of the SSP, we propose that a larger share of operations costs be borne directly by participant institutions. This would permit AAZPA grants to focus on development of specific services needed by AAZPA.

In the enclosed report (page 10), effects of inflation on the fee are considered. A fee of \$1.40 is proposed as a 50%-of-inflation adjustment. If this were endorsed and put in place for FY 83, an AAZPA grant level of \$30,000 would permit \$10,000 to \$15,000 to be spent to deliver specific AAZPA-requested services. Another combination yielding about the same results is a \$1.20 fee with an associated \$40,000 grant level. Other combinations are possible. What is important is to begin to adjust to the inflation since 1974, and to begin to take advantage of the overhauled ISIS system, in which so much time, energy, and effort have been invested.

We ask that the AAZPA Board give the most serious consideration to endorsement of the combination of fee increase and associated grant level which will permit some inflation compensation and permit some real growth. Action, as well as consideration, is needed. Thank you all for the considerable effort you have made to understand the ISIS program's goals and realities during the past year.

Sincerely,

Nathan R. Flesness

Nathan R. Flesness
ISIS Project Director

ISIS

International Species Inventory System ^{EK}



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

A Program of the American Association
of Zoological Parks and Aquariums

1980 ANNUAL REPORT
of the
INTERNATIONAL SPECIES INVENTORY SYSTEM (ISIS)

11 August 1980

Nathan R. Flesness
ISIS Project Director

Edward Kohn
General Director
Minnesota Zoological Garden

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Detailed Supporting Information	Appendix

INTRODUCTION

This annual report of the International Species Inventory System (ISIS) is intended to present a brief review of finances, participation, plans for the future, and current issues. For clarity, some details such as participation lists and itemized budgets are reserved for the appendix.

A simple one page financial statement has been adopted, similar to that used by many other organizations. On this statement, the focus is the functions of ISIS, rather than specific items like supplies. This is necessarily approximate, but it is more meaningful.

Participation trends are shown graphically as well as by the list of new participants included. Participation continues to increase at a substantial rate, both in terms of the number of institutions actually submitting data, and in terms of the comprehensiveness of the data they submit. Geographically, participation is beginning significant expansion; twelve additional European institutions and one in New Zealand have made commitments to participate.

Additional progress has been made in terms of ISIS paying it's own way. New arrangements for Fiscal Year 1981, already in effect, include paying identifiable physical and administrative shelter costs to the Minnesota Zoological Garden, our host institution.

Two financial policy changes are discussed in this report. These are needed to ensure equitable fees, and to maintain participation fees as the basic financial support for ISIS. The changes will make it financially advantageous for institutions to participate rather than simply subscribe to ISIS services, and will raise the basic ISIS participation rate for the first time.

A major overhaul of the computer structure used by ISIS is now underway. Plans for this more flexible and more efficient system are discussed, as well as progress to date. This overhaul is an effort to incorporate the experience of the last six years into a better system. This improved system will collect higher quality information, and return more of it to the users of ISIS services.

SIGNIFICANT EVENTS FOR ISIS DURING FISCAL 1980

- October IUDZG Studbook Symposium at Copenhagen supports ISIS concept, several studbook keepers and European zoos commit to participate.
- December ISIS adds a third full-time position, ISIS Records Editor.
- January A time-sharing terminal and printer is purchased for the ISIS offices. This permits access to the computer system for the first time from the ISIS office.
- Results of the AAZPA-ISIS Liaison Committee telephone poll of ISIS users are reported to ISIS. This is an effective way to find out how reports are used, perceptions, needs, etc..
- February The Physiological Laboratory Data Subsystem (Phys Norms) generates reports for participants for the first time. This is the completion of an 11-zoo pilot project, resulting in institution reports and a pooled norms summary report.
- March Improved ISIS Species Distribution Reports sent to all participants. This report shows, for the first time, the age and sex of each of the 45,000 living animals included.
- April ISIS adds a half-time clerk/typist, raising staff to 3½.
- June Two day site visit to ISIS and the Minnesota Zoo by Robert Wagner, AAZPA Executive Director, and Karen Sausman, AAZPA Board Member.
- First data received under the "Kansas plan", whereby larger zoos aid and support participation by smaller ones.
- IUCN Captive Breeding Specialist Group meets at Jersey, supports ISIS concept. Further participation commitments received from European zoos.

SUMMARY FINANCIAL STATEMENT FOR THE INTERNATIONAL
SPECIES INVENTORY SYSTEM

FISCAL YEAR 1980 (1 July 1979 through 30 June 1980)

BALANCE ON HAND AS OF 1 JULY 1979..... \$9,602

RECEIPTS:

Late participation fees from 1978	\$ 4,759
Participation fees from 1979	\$44,077
AAZPA Grant	\$20,000
AAZV Contract	\$ 3,000
Chimpanzee Project Contract	\$21,000
IMS Grant	\$25,000
Optional reports, misc.	<u>\$ 2,476</u>
Total Receipts	\$120,312

OBLIGATIONS

Data acquisition/entry	\$35,782
Report production	\$ 5,000
Education/Recruitment	\$ 9,500
Development	\$30,000
Special contract obligations	\$15,000
Equipment	\$15,000
Overhead	<u>\$ 5,530</u>
Total Obligations	\$115,812

BALANCE ON HAND AS OF 1 JULY 1980..... \$14,102*

* This carryover to the next fiscal year has been widely misunderstood. It is not "profit". ISIS participation fees are not received until nine months after the start of the fiscal year. Funding for ISIS operations during this nine months depends on substantial carryover plus grant and contract income. Ideally, the balance on hand would be enough to sustain operations for these nine months; that is, three-quarters of the annual budget.

PROJECTED FINANCIAL STATEMENT FOR ISIS, FISCAL YEAR 1981
(1 July 1980 through 30 June 1981)

Balance on Hand as of 1 July 1980 \$14,102

RECEIPTS:

Late participation fees from 1979	\$ 5,000
Participation fees from 1980	\$47,000
AAZPA Grant	\$30,000
AAZV Contract	\$10,000
Chimpanzee project contract	\$35,000
Second IMS Grant*	\$35,000*
Optional reports, other	<u>\$ 4,000</u>

Projected Total Receipts \$166,000

OBLIGATIONS:

Data acquisition/entry	\$48,000
Report production	\$10,000
Education/Recruitment	\$10,000
Development	\$15,000
Special IMS Development	\$35,000*
Particular contract obligations	\$25,000
Equipment	\$ 8,000
Overhead	<u>\$15,000</u>

Projected Total Obligations \$166,000

Balance anticipated as of 1 July 1981 est. \$14,102

*IMS special project grant application pending. Funding and development contingent upon success with the application. Awards are expected to be announced in September.

PROJECTED FINANCIAL STATEMENT FOR ISIS, FISCAL YEAR 1982
(1 July 1981 through 30 June 1982)

Anticipated balance on hand as of 1 July 1981 est. \$14,102

RECEIPTS:

Late participation fees from 1980	\$ 5,000
Participation fees from 1981	\$65,000*
AAZPA Grant	\$30,000**
AAZV Contract	\$10,000
Chimpanzee Project Contract	\$35,000
Optional reports, misc.	<u>\$ 5,000</u>
Projected Total Receipts	\$150,000

OBLIGATIONS:

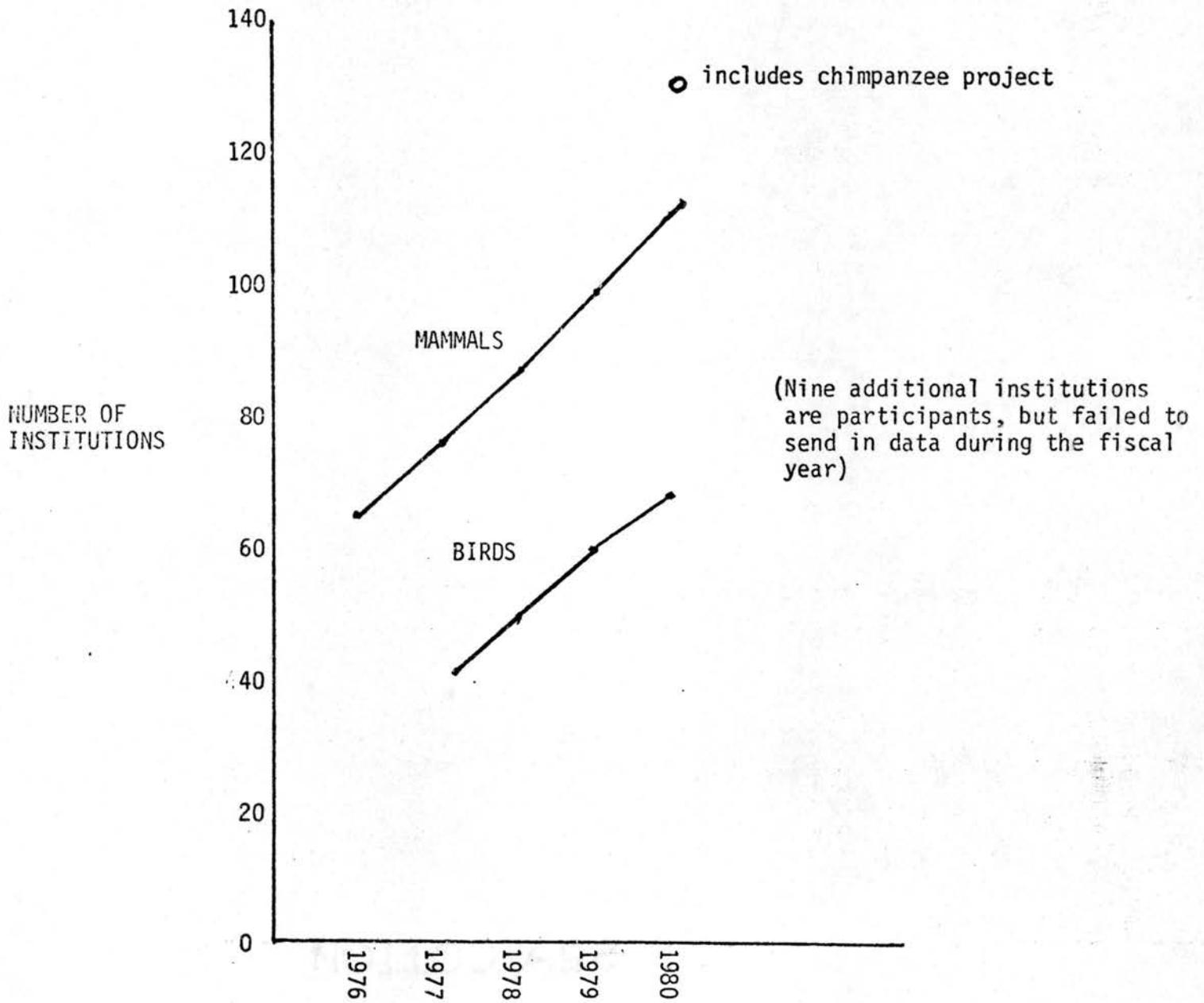
Data acquisition/entry	\$55,000
Report production	\$12,000
Education/Recruitment	\$10,000
Development	\$15,000
Special contract obligations	\$25,000
Equipment	\$10,000
Overhead	<u>\$18,000</u>
Projected Total Obligations	\$145,000

Anticipated balance on hand as of 1 July 1982 est. \$19,102

*This assumes the rate increase to \$1.30 effective on March, 1981 invoices.

**Serious consideration should be given to AAZPA participation in ISIS development.

NUMBER OF INSTITUTIONS CONTRIBUTING DATA TO ISIS EACH YEAR
(FISCAL YEARS)



CHANGES IN ISIS PARTICIPATION, FY 1980

FIRST DATA SUBMITTED IN FY 1980

Columbus Zoological Gardens, Powell, Ohio, USA
 Emporia Zoo, Emporia, Kansas (Kansas plan)
 Engesser's Exotic Felines, Jacksonville, Florida, USA
 Indianapolis Zoological Park, Indianapolis, Indiana, USA
 International Crane Foundation, Baraboo, Wisconsin, USA
 Point Defiance Zoo, Tacoma, Washington, USA (red wolves only)
 Van Saun Park Zoo, Paramus, New Jersey, USA
 Wolfland International, Shohola, Pennsylvania, USA

RESTARTED WITH DATA IN FY 1980

Atlanta Zoological Park, Atlanta, Georgia, USA
 Arizona-Sonora Desert Museum, Tucson, Arizona, USA (Mexican wolves only)
 Dickerson Park Zoo, Springfield, Missouri, USA
 Ellen Trout Park Zoo, Lufkin, Texas, USA
 Memphis Zoological Gardens, Overton Park, Memphis, Tennessee, USA
 Santa Fe Teaching Zoo, Gainesville, Florida, USA

REGISTRATION FEE RECEIVED, BUT NO DATA YET

Behavioral Study of Birds and Animals, Ltd., N. Hollywood, California, USA
 Bradwood Farm, Reddick, Florida, USA
 Greenville Zoological Park, Greenville, South Carolina, USA
 Hawthorne Circus Corp., Greyslake, Illinois, USA
 Salmonier Nature Park, Holyrood, Newfoundland, CANADA
 Society of Scientific Care, San Diego, California, USA
 Southern Tier Park Zoo, Ross Park, Binghamton, New York, USA
 Thompson, Frank M. Inc., Jacksonville, Florida, USA
 Weed Park Zoo, Muscatine, Iowa, USA
 Zeehandelaar, Fred, New Rochelle, New York, USA

DISCONTINUING PARTICIPATION

Marineland of Florida, St. Augustine, Florida, USA

INACTIVE PARTICIPANTS (NO DATA IN AT LEAST A YEAR)

Beardsley Zoological Gardens, Bridgeport, Connecticut, USA
 Cen-Tex Zoo, Waco, Texas, USA
 Dade County Zoological Park, Miami, Florida, USA
 Denver Zoological Gardens, Denver, Colorado, USA
 Jersey Wildlife Preservation Trust, Jersey, Channel Islands, U.K.
 Racine Zoological Park, Racine, Wisconsin, USA
 Roger Williams Zoo, Providence, Rhode Island, USA
 St. Paul's Como Zoo, St. Paul, Minnesota, USA
 San Antonio Zoological Gardens, San Antonio, Texas, USA

ISIS has been physically and administratively sheltered by the Minnesota Zoological Garden since the beginning. There have been numerous suggestions for other shelter arrangements, or non-profit incorporation as a separate entity. Financial reasons, computer system access, grant-receiving status, etc. have made such suggestions impracticable.

However, it is important that ISIS develop into a viable, non-dependent program. This is being accomplished in stages, two of which are to assume financial responsibility for identifiable shelter costs at the Minnesota Zoo, and to shift operations away from the State of Minnesota Computer System, which is accessible only by State of Minnesota agencies (and which it is desirable to leave on other grounds).

Effective 1 July 1980, ISIS began paying identifiable shelter costs at MZG. State of Minnesota real estate experts evaluated the space used by ISIS and determined that a fair office rental is \$6.75 per square foot per year, which translates into \$445.50 per month.

In addition, ISIS will reimburse MZG for administrative support costs such as accounting, payroll, and grant administration. This will be done in proportion to the percentage of the total MZG budget that ISIS represents. For Fiscal Year 1981, the projected ISIS budget is about 2.5% of the MZG budget, so ISIS will support approximately 2.5% of MZG administrative operations. This will amount to about \$10,000 for Fiscal Year 1981.

Thus the total identified shelter cost is about \$15,000 per year. Projected ISIS budgets are based on this figure.

PROPOSED ISIS POLICY CHANGES

During Fiscal Year 1980 (1 July 1979 to 30 June 1980) there were no changes in previously existing ISIS policies. One new fee policy was developed in response to the availability of a new ISIS information product, the PDS reports. After evaluation of costs and discussion with the AAZPA-ISIS Liaison Committee, fees of \$50 per new report, or \$10 per copy of an existing one, were set.

Two policy changes are proposed for calendar year 1981. One is a raise in the rate charged those who subscribe to ISIS information services without providing information to ISIS. Some subscribers do not have captive animals; others do but for various reasons do not send data. Past policy has been that anyone can buy the ISIS Species Distribution Report for \$100 per copy. This is precisely the same cost as the minimum participation fee of \$100.

The Species Distribution Report is undervalued at this price, and for those holding animals there is no financial advantage to participate, instead of just subscribing. This is unfair to all the institutions who share their own data. It is proposed that the price for a copy of the ISIS Species Distribution Report be raised to \$500, with a reduced rate of \$250 for non-profit purchasers.

The second item is the basic ISIS participation rate. After the no-charge startup year of 1974, the basic ISIS rate has been \$1 per animal alive and on inventory as of 31 December. In six years this rate has remained constant, although there was a (disastrous) attempt to charge less for birds in 1976 and 1977 and the minimum fee was set at \$100 in 1978. During the six years, costs of materials, salaries, and data processing has been affected by inflation.

ISIS is now keeping track of 45,000 living animals plus their ancestors at a rate one-fifth that of other similar operations (e.g. American Kennel Club). The total support received directly from participants for this task, about \$45,000, now represents the purchase price of one gorilla.

It is proposed that the basic ISIS participation rate be raised to \$1.30, to appear on invoices sent in February, 1982, for participation during calendar year 1981. The minimum fee would remain \$100. This change would raise about \$12,000 per year additional, for a total of approximately \$60,000 participation fee income in 1982. This is less than ISIS minimum survival budget for 1982, but is a step towards a realistic proportion of ISIS activities and costs being supported by participants.

There are two major areas of focus for ISIS development. In simplest terms, these are people - the ISIS user community, and machines - ISIS Computer software and hardware.

Education/Recruitment. ISIS has a considerable responsibility for developing the level of understanding of ISIS services. A very substantial fraction of the professional staff of the institutions already participating have no good idea of the information available from ISIS, its uses and applications, and its comprehensiveness. A large share of the questions received at the ISIS office are already answered on reports previously sent to the asking institution.

Improved educational materials, ISIS staff presence at meetings, organizing workshops, talks, question and answer sessions, etc. are all necessary to develop the educated user community which will do the most to increase the value of ISIS services. In the last twelve months new materials have been developed, talks and presentations made at regional, national, and international meetings, and a display/workshop exhibit created for use at meetings.

Direct contact between ISIS staff and the user community will continue to be an important priority. Funds for travel to regional, national, and international meetings remain an important budget item.

During the past twelve months there has been an important multiplier of the number of personal contacts regarding ISIS made with the ISIS user community. The AAZPA-ISIS Liaison Committee has conducted telephone polls of users, and in addition has provided colleague to colleague encouragement for institutions considering ISIS participation. This greatly enhances contact, and in addition emphasizes that ISIS participation is the means of information sharing with the rest of the captive animal community, not merely sending the information to ISIS.

Computer System Improvements. To describe software/hardware priorities it is necessary to provide a brief background. Many ISIS users assume that we already have a system like the one we are now building.

Many computer systems with less ambitious goals than ISIS have failed, usually because of technical and financial over-extension. ISIS has survived, in spite of political and financial crises, partly because a simple, low-power system was built. The ISIS office was staffed by two people, all computer work was contracted out, and all reports were scheduled, standardized, production runs. Such a system design has the lowest production costs, and is most resilient to fiscal and technical crises.

ISIS probably survived because of this low-powered simplicity. However, this approach yields slow and cumbersome development inadequate development cost control, and a complete inability to produce new information services quickly.

During the seven years of operation to date, a valuable collection of about 250,000 records has been assembled, well over 100 institutions committed, a better funding base created, and expectations raised as more ISIS users see higher-powered, more flexible systems respond in ways that ISIS cannot.

It is now possible to redesign the system to take the experience of the past seven years into account, to improve flexibility, lower manual effort, and greatly increase the information returned to the users. ISIS is now underway with this redesign, using IMS grant funds as partial support. Several steps are necessary to accomplish the desired goals. The first was to be able to do computer work from the ISIS offices. This requires time-sharing equipment (CRT and printer) which ISIS has never had. Such equipment has now been purchased, enabling access to the University of Minnesota Cyber Computer System from the ISIS office via telephone.

Now that computer work can be done at ISIS, systems design, systems analysis, and programming skills must be applied. IMS grant funds have been used to hire Computer Software Associates, a local computer system consulting firm with appropriate experience and an excellent reputation. This firm, together with the ISIS Project Director are revising the ISIS data structure. The broad structure of the new system has been created, and the few cases where the new structure will alter existing procedures have been discussed with the AAZPA-ISIS Liaison Committee and/or its chairperson.

Implementing the design will require considerable programming, which will be accomplished by contract or adding a staff position, subject to available funds. An immediate effect of the new structure will be radically improved data quality. This will result from a new editing system, which will for the first time check data provided by one institution against that provided by previous holders of the same animal. ISIS will not require that the data match in most cases, but will inform users that they disagree or that data has been lost during animal transfer.

The new system will improve efficiency by taking over several laborious tasks now performed manually at the ISIS office. On the other hand, the new system will require more computer skills on the part of ISIS staff. Increased training for existing staff is beginning, and plans to create a staff position for a programmer/analyst are underway. Such a staff position would enable ISIS to continuously develop to meet user needs, in a cost and quality controlled manner, with much greater speed than has been the case.

The new system stops well short of being the all-flexible, all-knowing, immediate-answer-to-any-imaginable-question system that many users imagine all computer systems to be. Such systems, for a data base as large as ISIS, would be very much more expensive to support. However, the new system will be a very large step up from the straight production system ISIS has been. Importantly, since it will place ISIS staff in charge of the computer system in a direct access manner, the new system will permit continued growth of useful information services.

APPENDIX

History of ISIS funding	a
ISIS Fee History	b
ISIS Obligations, FY 1980 and FY 1981	c
History of New ISIS Information Services	e
List of ISIS Participants	f
Map of ISIS Participants	i

(\$166,000.00)

a

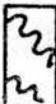
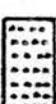
HISTORY OF ISIS FUNDING

ANNUAL BUDGET
IN THOUSANDS

140
130
120
110
100
90
80
70
60
50
40
30
20
10
0

* In 1973, 1974, and 1975
ISIS received over \$100,000
worth of donated services
and professional time. This
is not shown.

1974 1975 1976 1977 1978 1979 1980 1981

-  Primate Steering Committee Contract
-  Institute of Museum Services Grant
-  Private Foundations and other
-  U.S.D.I.
-  AAZV
-  AAZPA (loan)
-  AAZPA
-  Participant Fees

*2.5 AAZV
6,000*

1974 1975 1976 1977 1978 1979 1980 1981

ISIS FEES AND THEIR HISTORY

<u>FISCAL YEAR</u>	<u>ISIS PARTICIPATION FEE</u>	<u>FEE INCOME</u>
1974	no charge	\$. 0
1975	voluntary \$1 per mammal	\$ 14,000
1976	\$1 per mammal, \$0.35 per bird	\$ 23,000
1977	\$1 per mammal, \$0.35 per bird	\$ 26,600
1978	\$1 per animal, \$100 minimum	\$ 32,000
1979	\$1 per animal, \$100 minimum	\$ 36,000
1980	\$1 per animal, \$100 minimum	\$ 42,900
1981	\$1 per animal, \$100 minimum	\$ 47,000 projected
1982	\$1.30*per animal, \$100 minimum	\$ 60,000 projected

*Proposed fee change to take effect in fiscal year 1982, on March 1982 invoices.

TOTAL ISIS OBLIGATIONS FY 1980

c

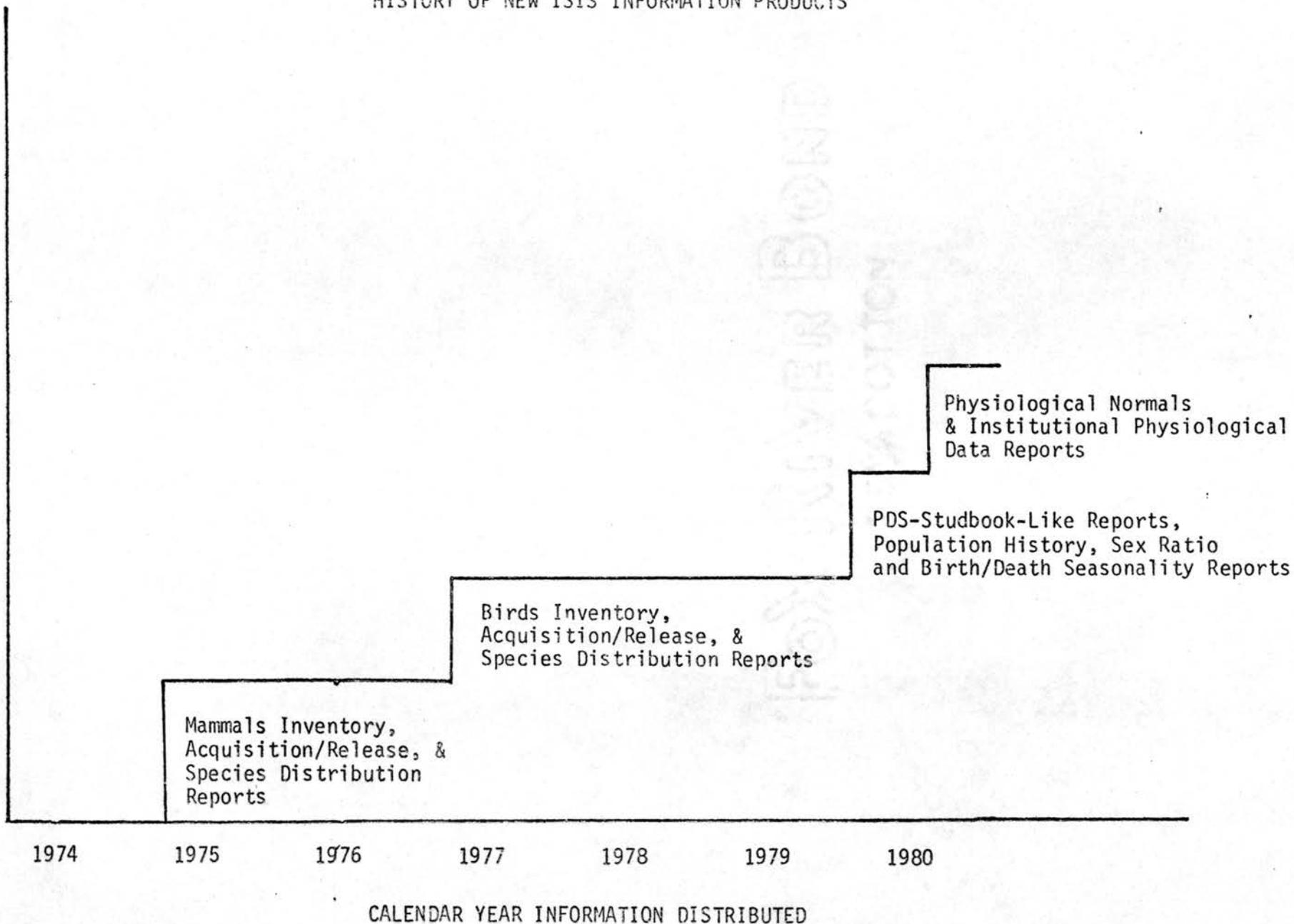
Salaries and benefits	35,000
Data processing	28,995
Contracts/Consultants	14,345
Printing	1,752
Postage/Communications	1,894
Travel	7,431
Supplies	667
Repairs	148
Miscellaneous	980
Overhead	7,700
Equipment purchase	<u>16,900</u>
	\$115,812

PROJECTED ISIS OBLIGATIONS FY 1981

Salaries and benefits	70,000
Data Processing	35,000
Contracts/Consultants	21,000
Printing	2,000
Communication/Postage	2,000
Supplies	1,500
Repairs	500
Miscellaneous	750
Travel	10,000
Equipment purchase	8,250
Overhead	<u>15,000</u>
	\$166,000

HISTORY OF NEW ISIS INFORMATION PRODUCTS

ISIS
SERVICES

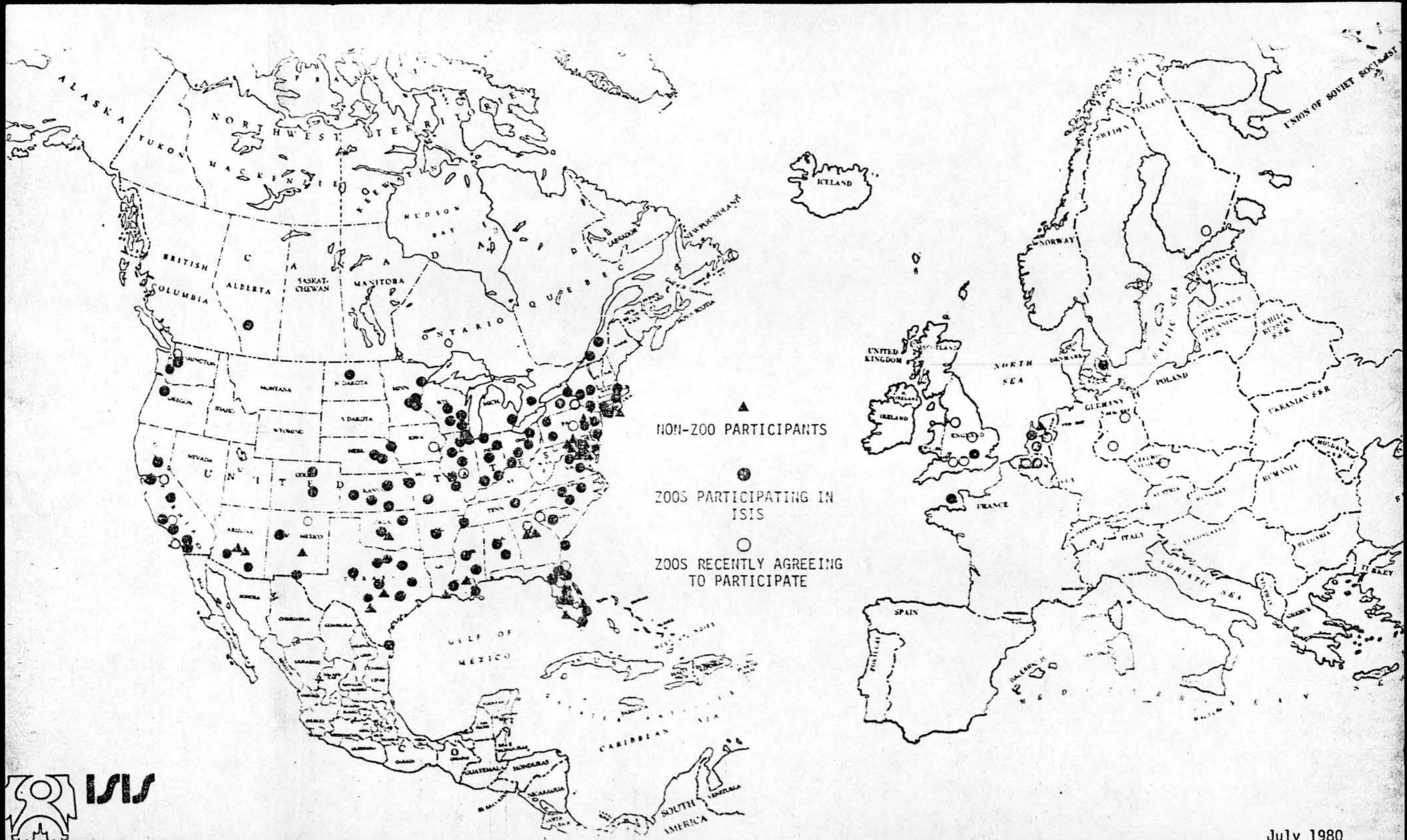


ISIS Participants as of 1 June 1980 (excludes new European zoos with no data yet) ^f

310544001 ABILENE ZOOLOGICAL GARDENS, ABILENE, TEXAS, USA
310208017 AFRICAN LION SAFARI, ROCKTON, ONTARIO, CANADA
310504002 ARKANSAS, ZOO OF, LITTLE ROCK, ARKANSAS, USA
310503004 ARIZONA SONORA DESERT MUSEUM, TUCSON, ARIZONA, USA (MEXICAN WOLVES ONLY)
310511002 ATLANTA ZOOLOGICAL PARK, ATLANTA, GEORGIA, USA
310519004 AUDUBON PARK ZOO, NEW ORLEANS, LOUISIANA, USA
310203700 AVIAN BEHAVIOUR LABORATORY, WINNIPEG, MANITOBA, CANADA
310521001 BALTIMORE ZOO, BALTIMORE, MARYLAND, USA
310507001 BEARDSLEY ZOOLOGICAL GARDENS, BRIDGEPORT, CONNECTICUT, USA
310501001 BIRMINGHAM ZOO, BIRMINGHAM, ALABAMA, USA
310510903 BRADWOOD FARM, REDDICK, FLORIDA
310533007 BUFFALO ZOOLOGICAL GARDENS, BUFFALO, NEW YORK, USA
310533039 BURNET PARK ZOO, SYRACUSE, NEW YORK, USA
310510040 BUSCH GARDENS, TAMPA, FLORIDA, USA
310544028 CALDWELL CHILDREN'S ZOO, TYLER, TEXAS, USA
310201002 CALGARY ZOO AND NATURAL HISTORY PARK, CALGARY, ALBERTA, CANADA
310544702 CAMP COOLEY RANCH, FRANKLIN, TEXAS, USA
310532700 CANYON COLORADO EQUID SANCTUARY, COLORADO SPRINGS, COLORADO, USA
310524900 CARLOS AVERY WILDLIFE MANAGEMENT AREA, FOREST LAKE, MINNESOTA, USA
310544030 CEN-TEX ZOO, WACO, TEXAS, USA
310503700 CHEETAHS UNLIMITED, PHOENIX, ARIZONA, USA
310506002 CHEYENNE MT. ZOO, COLORADO SPRINGS, COLORADO, USA
310514004 CHICAGO ZOOLOGICAL PARK, BROOKFIELD, ILLINOIS, USA
310536005 CINCINNATI, ZOOLOGICAL SOCIETY OF, CINCINNATI, OHIO, USA
310536007 CLEVELAND METROPARKS ZOOLOGICAL PARK, CLEVELAND, OHIO, USA
110803002 COPENHAGEN ZOOLOGISK HAVE, COPENHAGEN, DENMARK
310505363 CROWN ANIMAL SALES, SAN LORENZO, CALIFORNIA, USA
310510049 DADE COUNTY ZOOLOGICAL PARK, MIAMI, FLORIDA, USA
310544008 DALLAS ZOOLOGICAL GARDENS, DALLAS, TEXAS, USA
310506004 DENVER ZOOLOGICAL GARDENS, DENVER, COLORADO, USA
310523007 DETROIT ZOOLOGICAL PARK, ROYAL OAK, MICHIGAN, USA
310526007 DICKERSON PARK ZOO, SPRINGFIELD, MISSOURI, USA
310510047 DREHER PARK ZOOLOGICAL GARDEN, WEST PALM BEACH, FLORIDA, USA
310534900 DUKE UNIVERSITY PRIMATE FACILITY, DURHAM, NORTH CAROLINA, USA
310524001 DULUTH ZOO, DULUTH, MINNESOTA, USA
310544009 EL PASO ZOOLOGICAL PARK, EL PASO, TEXAS, USA
310510704 ENGESSER'S EXOTIC FELINES, JACKSONVILLE, FLORIDA, USA
310539005 ERIE ZOO, ERIE, PENNSYLVANIA, USA
310528001 FOLSOM CHILDREN'S ZOO, LINCOLN, NEBRASKA, USA
310515004 FORT WAYNE CHILDREN'S ZOOLOGICAL GARDENS, FORT WAYNE, INDIANA, USA
310544010 FORT WORTH ZOOLOGICAL PARK, FORT WORTH, TEXAS, USA
310522002 FRANKLIN CHILDREN'S ZOO, DORCHESTER, MASSACHUSETTS, USA
310522003 FRANKLIN PARK ZOO, DORCHESTER, MASSACHUSETTS, USA
310544006 GLADYS PORTER ZOO, BROWNSVILLE, TEXAS, USA
310514011 GLEN OAK ZOO, PEORIA, ILLINOIS, USA
310210003 GRANBY, SOCIETE ZOOLOGIQUE DE, GRANBY, QUEBEC, CANADA
310519002 GREATER BATON ROUGE ZOO, BATON ROUGE, LOUISIANA, USA
310541004 GREENVILLE ZOO, CLEVELAND PARK, GREENVILLE, SOUTH CAROLINA, USA
310541014 HAWTHORNE CIRCUS CORP., GRAYSLAKE, INDIANA
310528005 HENRY DOORLY ZOO, OMAHA, NEBRASKA, USA
310550005 HENRY VILAS PARK ZOO, MADISON, WISCONSIN, USA
310539015 HIGHLAND PARK ZOO, PITTSBURGH, PENNSYLVANIA, USA
310544016 HOUSTON ZOOLOGICAL GARDENS, HOUSTON, TEXAS, USA

310515006 INDIANAPOLIS ZOOLOGICAL PARK, INDIANAPOLIS, INDIANA, USA
 310550903 INTERNATIONAL CRANE FOUNDATION, BARABOO, WISCONSIN, USA
 310525004 JACKSON ZOOLOGICAL PARK, JACKSON, MISSISSIPPI, USA
 310510015 JACKSONVILLE ZOOLOGICAL PARK AND SOCIETY, JACKSONVILLE, FLORIDA, USA
 120101001 JERSEY WILDLIFE PRESERVATION TRUST, JERSEY, BRITISH ISLES
 310525003 KAMPER ZOOLOGICAL PARK, HATTIESBURG, MISSISSIPPI, USA
 310526003 KANSAS CITY ZOOLOGICAL GARDENS, KANSAS CITY, MISSOURI, USA
 310547008 KINGS DOMINION (LION COUNTRY SAFARI), DOSWELL, VIRGINIA, USA
 310536009 KINGS ISLAND, KINGS MILLS, OHIO, USA
 310543005 KNOXVILLE ZOOLOGICAL PARK, KNOXVILLE, TENNESSEE, USA
 310517007 LEE RICHARDSON ZOO, GARDEN CITY, KANSAS, USA
 310528001 LINCOLN CHILDREN'S ZOO, LINCOLN, NEBRASKA, USA
 310528002 LINCOLN MUNICIPAL ZOO, LINCOLN, NEBRASKA, USA
 310514006 LINCOLN PARK ZOO, CHICAGO, ILLINOIS, USA
 120225003 LONDON, ZOOLOGICAL SOCIETY OF, LONDON, ENGLAND
 310505018 LOS ANGELES ZOO, LOS ANGELES, CALIFORNIA, USA
 310518002 LOUISVILLE ZOOLOGICAL GARDEN, LOUISVILLE, KENTUCKY, USA
 310543007 MEMPHIS ZOO, OVERTON PARK, MEMPHIS, TENNESSEE, USA
 310515003 MESKER PARK ZOO, EVANSVILLE, INDIANA, USA
 310208024 METRO TORONTO ZOO, WEST HILL, ONTARIO, CANADA
 310505017 MICKE GROVE ZOO, LODI, CALIFORNIA, USA
 310514002 MILLER PARK ZOO, BLOOMINGTON, ILLINOIS, USA
 310550008 MILWAUKEE COUNTY ZOO, MILWAUKEE, WISCONSIN, USA
 310524007 MINNESOTA ZOOLOGICAL GARDEN, APPLE VALLEY, MINNESOTA, USA
 310501003 MONTGOMERY ZOO, MONTGOMERY, ALABAMA, USA
 310509004 NATIONAL ZOOLOGICAL PARK, WASHINGTON, D.C., USA
 310509904 NATIONAL ZOOLOGICAL PARK OFFICE OF ZOOLOGICAL RESEARCH, WASHINGTON, D.C., USA
 310547007 NATIONAL ZOOLOGICAL PARK CONSERVATION CENTER, FRONT ROYAL, VIRGINIA, USA
 310534005 NATURAL SCIENCE CENTER, GREENSBORO, NORTH CAROLINA, USA
 310522005 NEW ENGLAND AQUARIUM, BOSTON, MASSACHUSETTS, USA
 310533005 NEW YORK ZOOLOGICAL SOCIETY, BRONX, NEW YORK, USA
 310511902 NEW YORK ZOOLOGICAL SOCIETY ST. CATHERINE'S SURVIVAL CENTER, ST. CATH. ISL., GEORGIA, USA
 310534001 NORTH CAROLINA ZOOLOGICAL PARK, ASHEBORO, NORTH CAROLINA, USA
 310537005 OKLAHOMA CITY ZOO, OKLAHOMA CITY, OKLAHOMA, USA
 310539013 PHILADELPHIA ZOOLOGICAL GARDEN, PHILADELPHIA, PENNSYLVANIA, USA
 310548009 POINT DEFIANCE ZOO, TACOMA, WASHINGTON, USA (RED WOLVES ONLY)
 310210012 QUEBEC, JARDIN ZOOLOGIQUE DE, CHARLESBOURG, QUEBEC, CANADA
 310550010 RACINE ZOOLOGICAL PARK, RACINE, WISCONSIN, USA
 310517009 RALPH MITCHELL ZOO, INDEPENDENCE, KANSAS, USA
 310532001 RIO GRANDE ZOO, ALBUQUERQUE, NEW MEXICO, USA
 310541003 RIVERBANKS ZOOLOGICAL PARK, COLUMBIA, SOUTH CAROLINA, USA
 310505014 RÜEDING PARK ZOO, FRESNO, CALIFORNIA, USA
 310540002 ROGER WILLIAMS ZOO, PROVIDENCE, RHODE ISLAND, USA
 310535002 ROOSEVELT PARK ZOO, MINOT, NORTH DAKOTA, USA
 112009001 ROTTERDAMSE DIERGAARDE (STICHTING KONINKLIJKE), ROTTERDAM, NETHERLANDS
 310505030 SACRAMENTO ZOO, SACRAMENTO, CALIFORNIA, USA
 310521003 SALISBURY ZOO, SALISBURY, MARYLAND, USA
 310205001 SALMONIER PROVINCIAL WILDLIFE PARK, HOLYROOD, NEWFOUNDLAND
 310544025 SAN ANTONIO ZOOLOGICAL GARDENS, SAN ANTONIO, TEXAS, USA
 310505032 SAN DIEGO WILD ANIMAL PARK, SAN DIEGO, CALIFORNIA, USA
 310505033 SAN DIEGO ZOOLOGICAL GARDENS, SAN DIEGO, CALIFORNIA, USA
 310505035 SAN FRANCISCO ZOO, SAN FRANCISCO, CALIFORNIA, USA
 310505041 SANTA BARBARA ZOOLOGICAL GARDENS, SANTA BARBARA, CALIFORNIA, USA
 310510011 SANTA FE COMMUNITY COLLEGE TEACHING ZOO, GAINESVILLE FLORIDA, USA
 310548004 SEATTLE AQUARIUM, SEATTLE, WASHINGTON, USA
 310517013 SEDGEWICK COUNTY ZOO, WICHITA, KANSAS, USA
 310533031 SENECA PARK ZOO, ROCHESTER, NEW YORK, USA
 310514005 SHEDD (JOHN G.) AQUARIUM, CHICAGO, ILLINOIS, USA
 310505911 SOCIETY OF SCIENTIFIC CARE (PAT QUILLEN), SAN DIEGO, CALIFORNIA, USA

310515011 SOUTH BEND ZOO (POTAWATOMI), SOUTH BEND, INDIANA, USA
310533003 SOUTHERN TIER PARK ZOO, ROSS PARK, BUNGHANTON, NEW YORK
310526006 ST. LOUIS ZOOLOGICAL PARK, ST. LOUIS, MISSOURI, USA
310524008 ST. PAUL'S COMO ZOO, ST. PAUL, MINNESOTA, USA
310510350 THOMPSON, FRANK M AND ASSOCIATES, JACKSONVILLE, FLORIDA, USA
310517012 TOPEKA ZOOLOGICAL PARK, TOPEKA, KANSAS, USA
310537006 TULSA ZOO, TULSA, OKLAHOMA, USA
310531011 TURTLE BACK ZOO, WEST ORANGE, NEW JERSEY, USA
310533041 UTICA ZOO, UTICA, NEW YORK, USA
310531006 VAN SAUN PARK ZOO, PARAMUS, NEW JERSEY, USA
310202011 VANCOUVER PUBLIC AQUARIUM, VANCOUVER, BRITISH COLUMBIA, CANADA
310510018 WALT DISNEY WORLD, LAKE BUENA VISTA, FLORIDA, USA
310522014 WALTER D. STONE ZOO, DORCHESTER, MASSACHUSETTS, USA
310538008 WASHINGTON PARK ZOO, PORTLAND, OREGON, USA
310526900 WILD CANID SURVIVAL AND RESEARCH CENTER, ST. LOUIS, MISSOURI, USA
310548005 WOODLAND PARK ZOOLOGICAL GARDENS, SEATTLE, WASHINGTON, USA
310539020 ZOO AMERICA, HERSHEY, PENNSYLVANIA, USA



ISIS

International Species Inventory System



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

A Program of the American Association
of Zoological Parks and Aquariums

HAMMERMILL
BOND

1979 ANNUAL REPORT
of the

INTERNATIONAL SPECIES INVENTORY SYSTEM (ISIS)

to the

OFFICERS AND DIRECTORS

AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

from the

MINNESOTA ZOOLOGICAL GARDEN

Respectfully submitted

Nathan R. Flesness
ISIS Project Director

Edward Kohn
General Director
Minnesota Zoological Garden

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INTRODUCTION

This document comprises the ISIS Annual Report for Fiscal Year 1979 (1 July 1978 through 30 June 1979). For purposes of study, this report is divided into two major parts, Operations and Development, with an overview preface. Separate reviews of activities, budgets, and projected budgets are provided for each part; the interrelationship of operations and development is made clear in the overview preface. Added emphasis has been placed on pictorial presentation in an attempt to convey a better view of ISIS activities.

Five weeks before the close of the fiscal year, Jan Olsen resigned as ISIS Systems Manager, accepting another computer position elsewhere. Nathan R. Flesness has replaced her as Systems Manager. We would like to thank Jan for aid she volunteered in the preparation of this annual report.

ISIS was pleased this year to host a meeting of the AAZPA-ISIS Liaison Committee. It seems very valuable to actually have committee members see the ISIS operations and physical headquarters. Furthermore, the committee and its chair, Judith Block, have been and promise to continue to be an effective means of communication of ISIS activities and policies with the AAZPA.

I. WHY HAVE AN ISIS?

The potential value of good multi-generation records of basic biological data is sometimes hard to appreciate, because such data is so rare. Of the 40,000 or so vertebrate species, such data exists for perhaps 50. One of the reasons for the scarcity of such data is that it is very hard to obtain in the wild. Almost all of what there is comes from captive animal populations in zoos, laboratories, or from animal husbandry centers.

The enormous value of this data has been fully exploited for just one "captive" species. This species is Homo sapiens. Church records, census data, etc., provide a large, though imperfect, set of multi-generation records for humans.

Demographic data and projections for humans are essential for planning at any level. How many, where, and with what rate of increase are essential pieces of information for anyone planning with respect to population.

Genetic and other reproductive data have also been important in several ways. It's existence has permitted the identification of heritable disease, and played a significant role in research on comparative nutrition, aging, cancer, etc. It has also permitted the most sensitive studies of inbreeding depression, allowing rather accurate assessment of the increased risks of matings of close relatives.

The same sort of data, if available for non-human animals, can be used in these same ways. It can be important to the future of the wild population, to the future of the captive population, and to the accumulation of fundamental biological understanding. Management of shrinking populations in the wild has more and more in common with management of captive populations. In both cases, the small population sizes mean that we cannot be casual about inbreeding, or about the age structure of the population.

To seriously approach these problems, we need data. The 30 or so sets of data for zoo animals are available only because of the dedication of a small group of individuals, the studbook-keepers. Their efforts in data collection and tabulation provide us with important information on those species that have been variously judged important. For the other hundreds or thousands of captive species we are not so fortunate. Partial records from a few institutional collections are all that are available at best.

This situation demanded change. In response to the need, a centralized captive animal biological data bank was created. Called ISIS (International Species Inventory System), the system began operations in 1974. It was created by Drs. U.S. Seal and Dale G. Makey, and has had financial support from participants, the U.S. Department of the Interior, the American Association of Zoological Parks and Aquaria, private foundations, the National Institutes of Health, and the American Association of Zoo Veterinarians. ISIS was provided critically needed institutional sponsorship and shelter by the Minnesota Zoological Garden, where ISIS staff and offices are located administratively and physically.

There are now more than 115 ISIS participants submitting data to the system. Each pays an annual fee based on the size of their animal inventory. In return, ISIS provides various information services. These services are growing, as is the quantity and quality of the data they are based on.

IMMEDIATE BENEFITS TO ISIS PARTICIPANTS

One immediate benefit to some ISIS participants is ISIS forms, editing, reports, and procedures. Together these provide a means whereby those institutions whose internal record keeping requires improvement can quickly reach the level of those who had developed such a system themselves. The ISIS system provides the basis for a very good internal records system, with basic items standardized but with options for local modification and improvement as local needs warrant. The second copy of ISIS forms is heavy stock paper, and is used by many ISIS participants as their fundamental animal record.

A further immediate benefit is inventory control. All participants receive annually (more frequently at extra cost) a list of their current inventory of captive animals, and a list of all birth/death/acquisition/release events at their institution during the last year.

Finally, but not least, ISIS provides coordinated information sharing between ISIS participants. This is achieved through the ISIS Species Distribution Report, which provides all ISIS participants with information of the who-has-what sort. This report is provided annually (more frequently at extra cost). It currently provides information on over 43,000 living mammals and birds held in 125 institutions.

COMING BENEFITS TO ISIS PARTICIPANTS

ISIS has provided the services discussed above for the last five years. During this period, the data base of accumulated information has grown rapidly. It now permits more technical questions to be asked and answered. To provide participants with more technical support, ISIS has developed two new subsystems. One provides detailed biological information on any taxa of interest, the other accumulates, analyses, and reports physiological laboratory data.

The Pedigree-Demography-Studbook Subsystem (PDS) is substantially completed. Much of it is undergoing final testing. This subsystem provides, for any ISIS taxa, a series of reports which include: graphical review of the history of the ISIS population births, deaths, and census; birth and death seasonality, birth sexratio, and three reports which are variants of the conventional zoological studbook. These studbook-like reports can serve as the basis for many management or research projects. PDS reports will be available as soon as a policy is reached regarding access and fees for them.

In development are further capabilities of the PDS subsystem, including reports which give detailed demographic projections for the population, and reports which analyse the extent and effects of inbreeding. Programming for these reports is largely completed.

Also in testing stages in the Physiological Norms Subsystem. This subsystem is designed to coordinate information sharing among the participants, providing each participant with an orderly summary of all of ISIS accumulated normal physiological data, with means and ranges. It also provides each participant with an orderly listing of all submitted data on the participant's own animals. These physiological norms reports should have significant clinical value.

LONG-TERM BENEFITS TO ISIS PARTICIPANTS

Beyond supporting and coordinating management decisions with various kinds of biological, demographic, and genetic information, ISIS has a growing value for future problem-solving and research. The value of the collected data grows as the collection becomes more complete, more accurate, and covers a longer time interval. This is particularly true for the Phys Norms reports, the inbreeding analyses, and the demographic analyses.

The size of the data base has been growing even faster than it appears. Each year, ISIS has provided participants with information on more living animals in captivity. But the ISIS data base grows as the generations of animals pass; animals which die no longer appear on the ISIS Inventory or Species Distribution Reports, but they remain in the data base and contribute to future demographic and genetic capabilities. ISIS records and stores transactions as they occur to each individual animal, for a total now approaching 250,000 transactions.

As further documented in this report, this long-term assemblage of multi-generation records brings benefits in permitting recall of the origins of animals currently held in collections. It can also have a very real value in assisting management decisions such as mate choices to reduce inbreeding, selecting stock for a re-introduction attempt, doing taxonomic research, etc. A continuous history from animals caught in the wild through those now in captive inventories is as important as the display tag in a museum: it is the only way to really know what you have.

As the data base size increases, and the number of ISIS participants continues to grow, the ISIS system will become a far richer source of information. It would be nice to have complete information on all captive animals, right now. This opportunity was missed. The only possible way to have such information in the future is to build a legacy of good, comprehensive biological information on all animals now held, year by year. The only alternative is to fail to collect the information, and be critically poor in a needed resource in the years ahead.

II. OVERVIEW PREFACE

This annual report contains a great deal of detailed information on ISIS activities and finances. This preface will summarize this detail to make it more understandable.

Figures 1 through 5, which follow, show the volume of information received and processed by ISIS, the growth in the volume of information provided to participants on each Species Distribution Report, our increasing knowledge of the sources of the captive population, the growth in ISIS participation over the years, and an approximation of the contributions of the many sources of ISIS financial support.

Next is a very condensed budget summary for Fiscal Years 1979, 1980, and 1981. So as not to be misled by the condensation, please refer to the detailed budget tables in the budget sections of the complete report.

ISIS is providing it's services to more zoos each year. However, zoos do not include all of the captive animal facilities of importance. ISIS has begun to include non-zoo facilities, in particular U.S. institutions holding chimpanzees, with the support of the Interagency Primate Steering Committee of the National Institutes of Health. Their support enables ISIS to take on additional tasks which will result in benefits to all ISIS participants.

We have attempted to apportion contracts ISIS has for non-zoo projects into those amounts ISIS spends which just fulfill contract obligations, and into those amounts which fulfill contract obligations but result in development of ISIS to the benefit of all participants.

Therefore, the development section of the annual report has become development and other projects, and budgets in this section show project specific and general operations enhancement divisions.

Figure 1

MAMMAL AND BIRD FORMS
RECEIVED BY MONTH

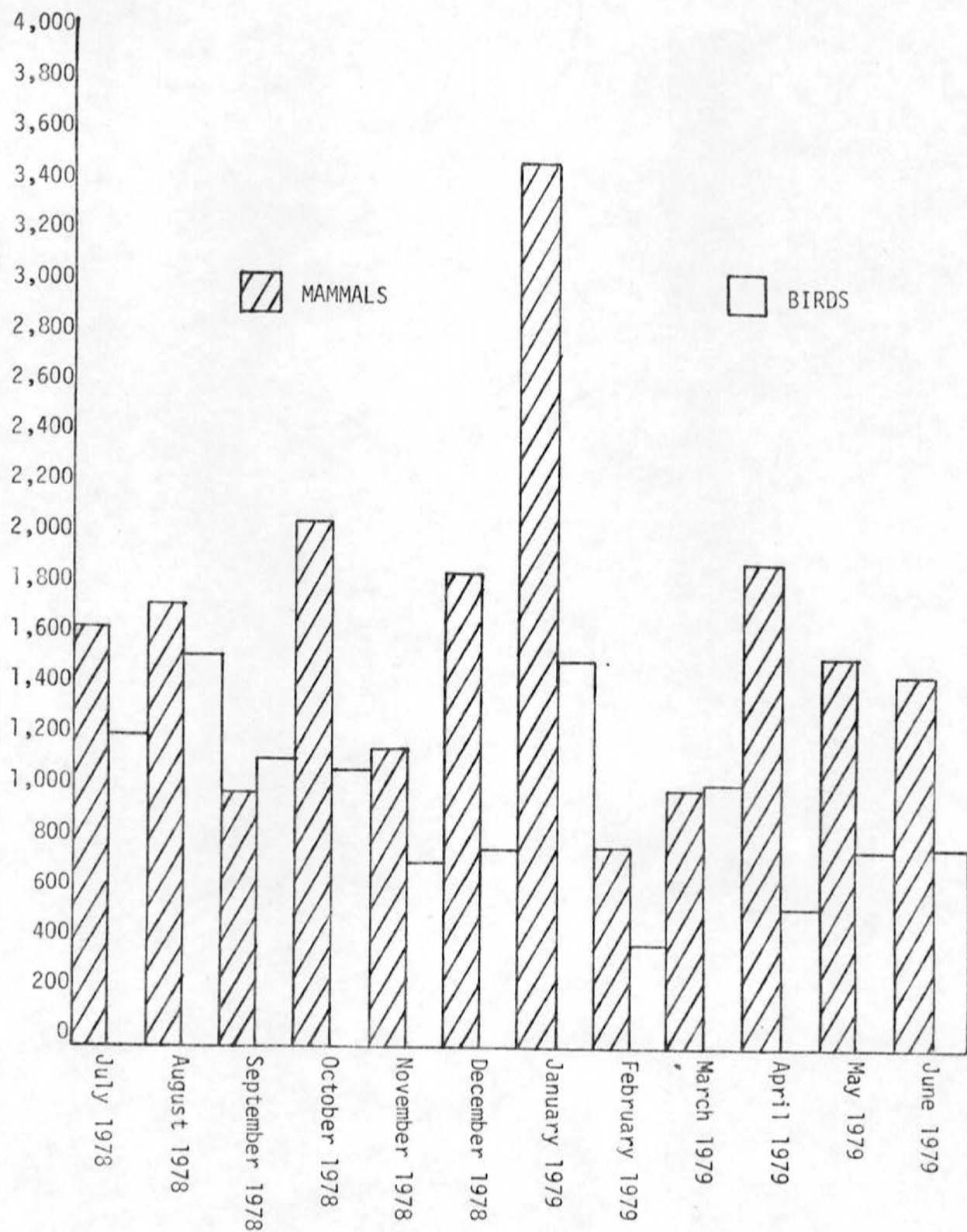


Figure 2

Quantitative Improvements In Captive Animal Data
Growth Of The ISIS Inventory

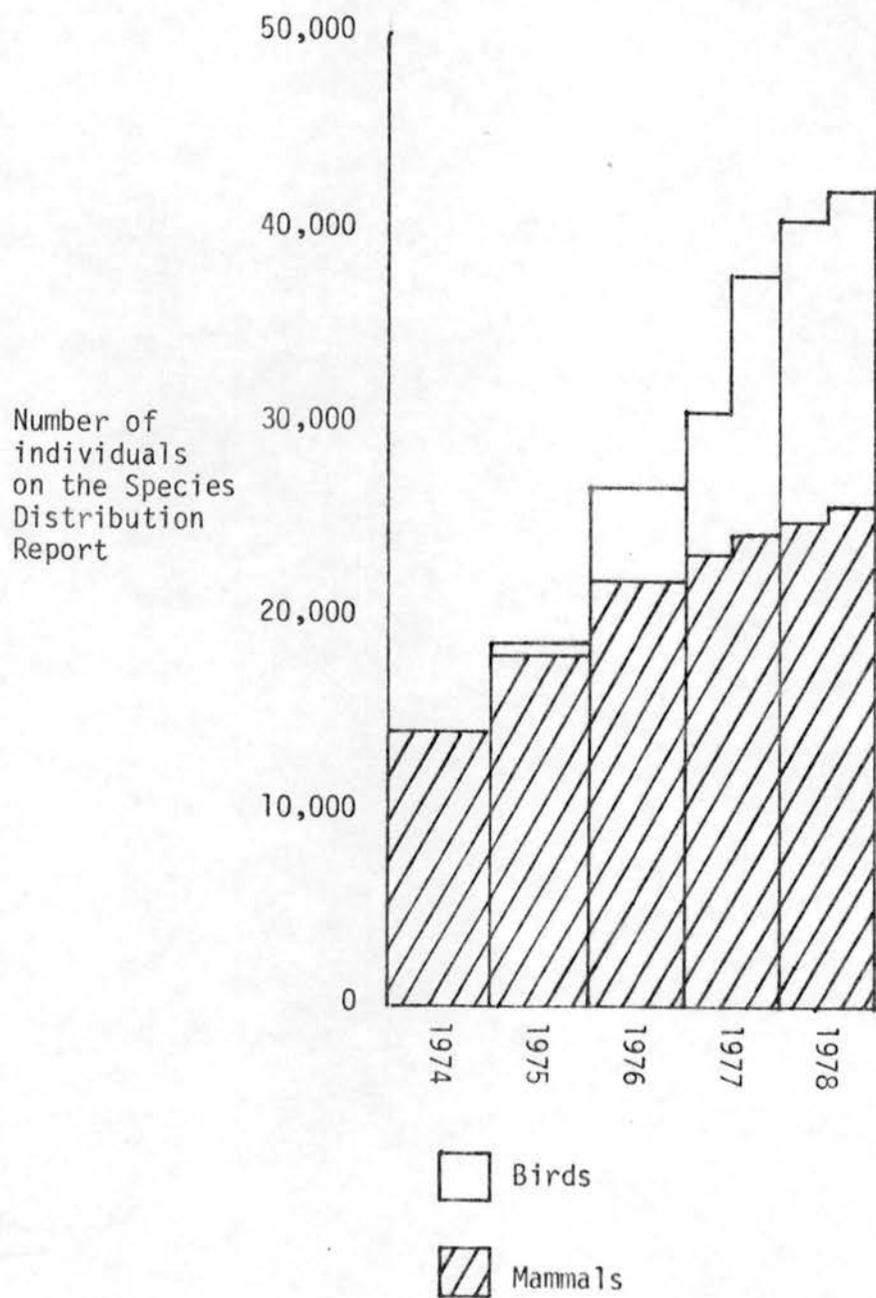


Figure 3

QUALITATIVE IMPROVEMENTS IN CAPTIVE ANIMAL DATA:
ORIGINS OF ANIMALS ON ISIS INVENTORY

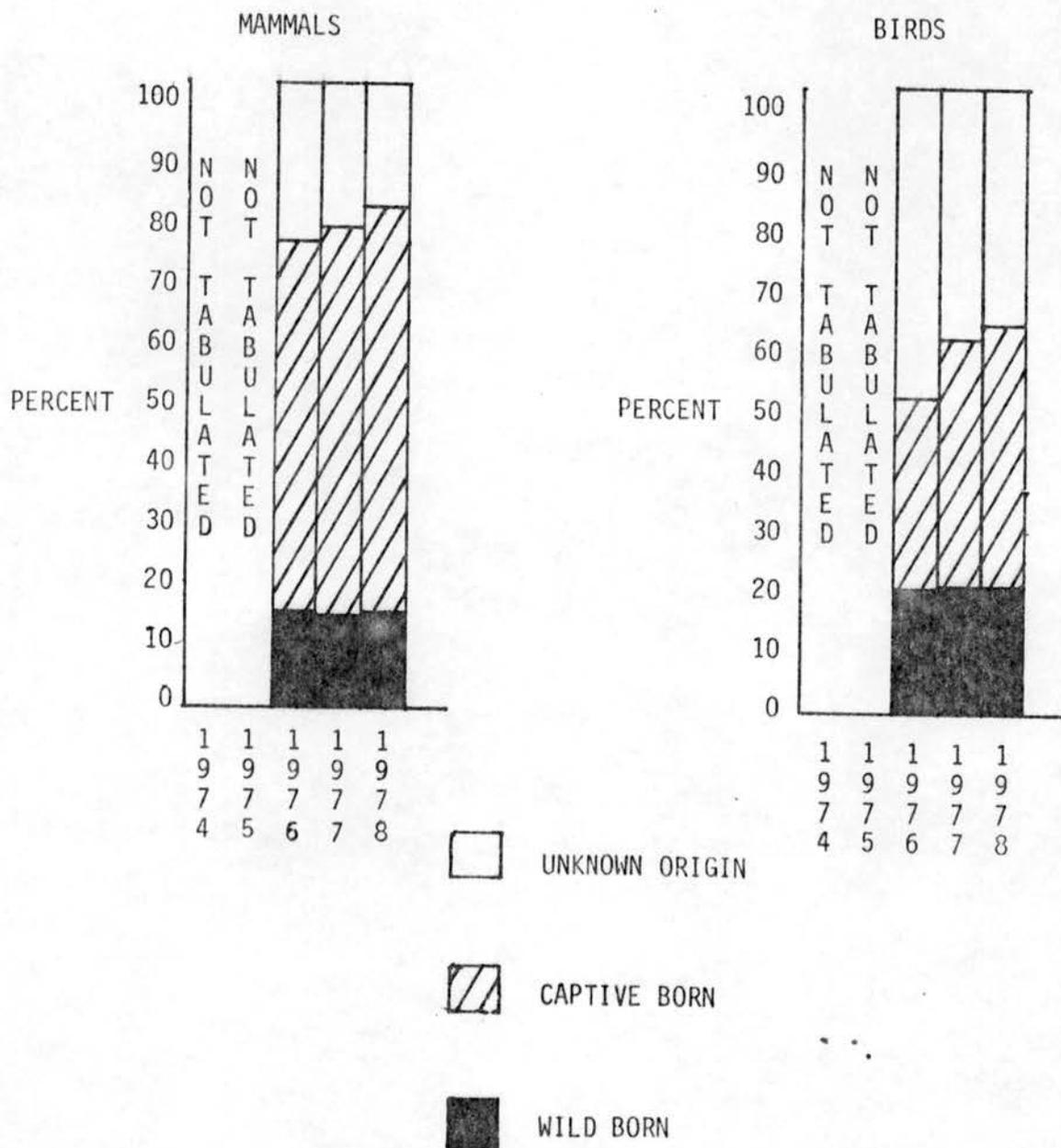


FIGURE 4

NUMBER OF INSTITUTIONS CONTRIBUTING DATA TO ISIS
(BY CALENDAR YEAR)

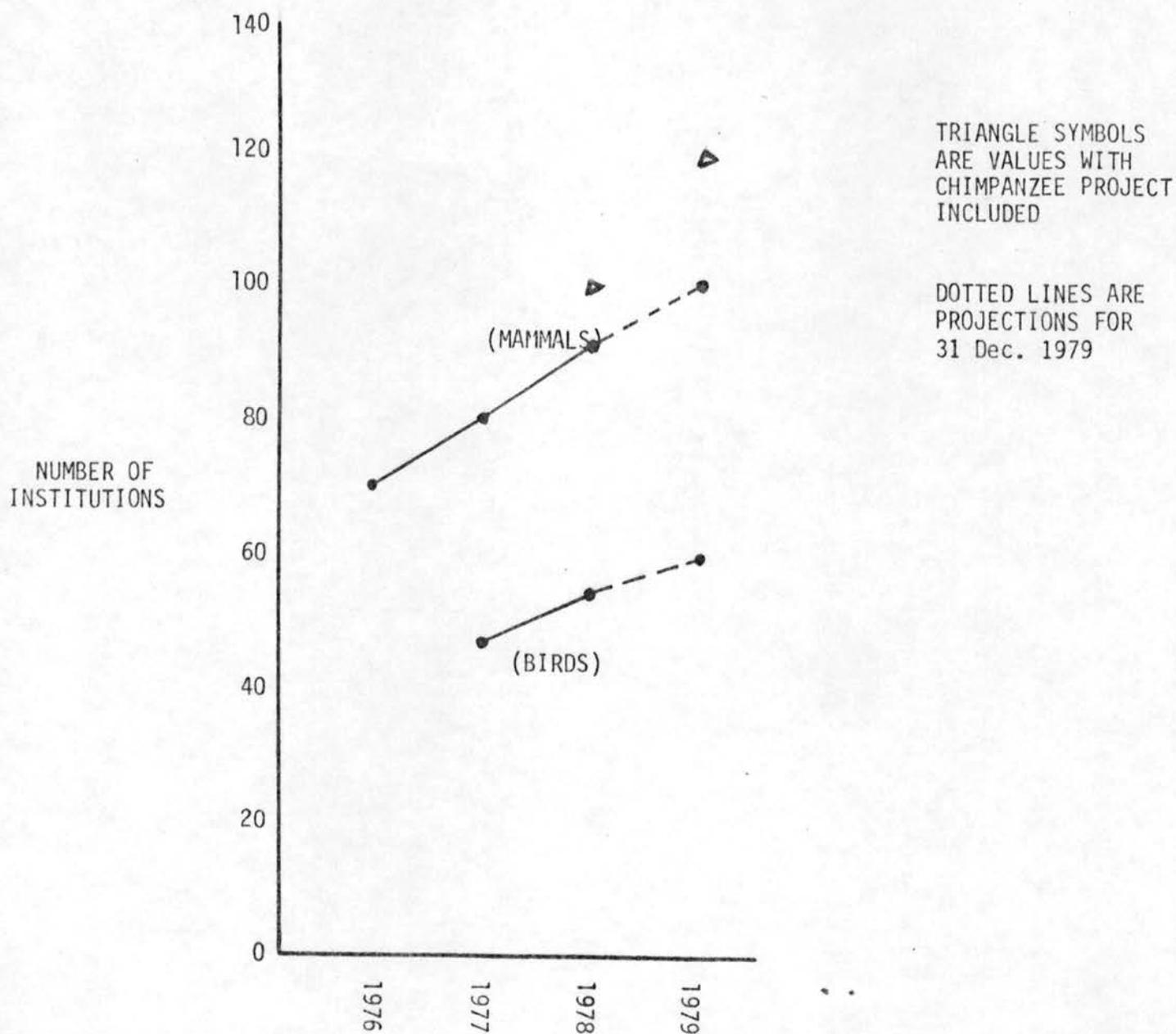
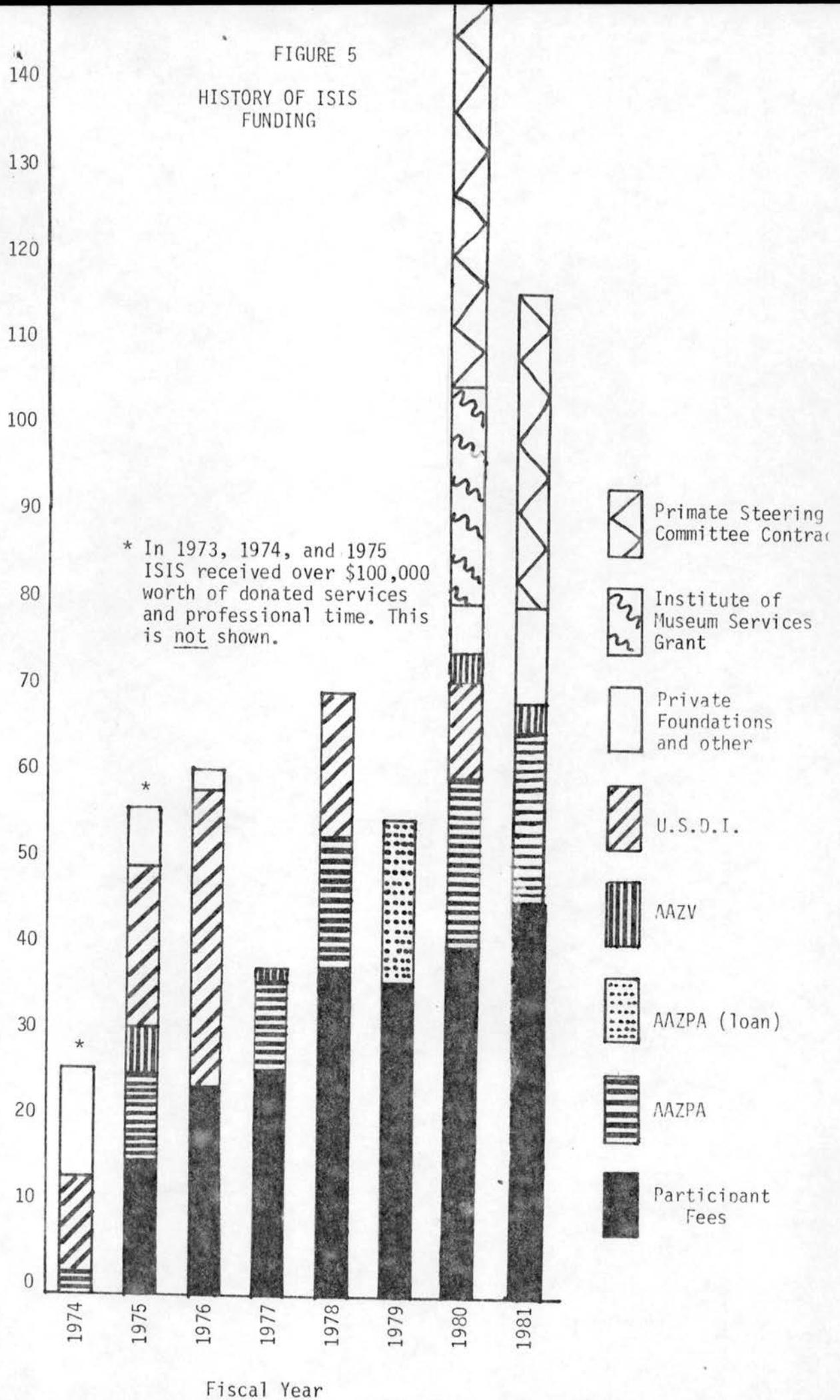


FIGURE 5
HISTORY OF ISIS
FUNDING

ANNUAL BUDGET
IN THOUSANDS



ISIS - BUDGET OVERVIEW

<u>INCOME</u>	FY 1979	FY 1980	FY 1981
Fees	\$35,000	\$40,000	\$45,000
AAZPA	20,000	20,000	20,000
Other:			
project specific	9,000	53,000	37,000
general enhancement	16,000	47,000	14,000
	<u>\$80,000</u>	<u>\$160,000</u>	<u>\$116,000</u>
<u>EXPENSES</u>			
Salary/benefits	\$32,000	\$55,000	\$60,000
Computer costs	21,000	25,000	20,000
Other	20,000	70,000	24,000
	<u>\$73,000</u>	<u>\$150,000</u>	<u>\$104,000</u>
<u>CARRYOVER TO NEXT FY</u>	\$ 7,000	\$10,000	\$12,000

ALL BUDGET ITEMS ROUNDED
TO NEAREST THOUSAND.

This budget overview summarizes the budget tables for operations and for development and other projects, which are presented in full detail in this annual report.

III. OPERATIONS - INVENTORY SYSTEM

A. Activity Review

Inventory System operations involve receiving information (data forms) from ISIS participants, checking them, processing them, and distributing reports to participants.

1. Information Received by ISIS.

During the course of Fiscal Year 1979, 19,116 mammal and 11,043 bird data forms were received by ISIS. These forms were received relatively continuously throughout the year, as shown by Figure 1. This suggests that many participants are continuously updating their ISIS inventory data, which is very desirable.

2. Information Checking by ISIS.

ISIS personnel maintain extensive logs on forms received, punched, and read by the computer. This ensures that no participant information is lost or confused at any step in the data entry process. Received forms are also visually scanned for errors or missing data before being keypunched. After these checks, data read into the computer is examined by a computer edit program, which checks the information for completeness and for consistency with previous information on the specimen. This year, the computer edit check identified problems in about 5% of the forms ISIS received, or about 1,500 such problems over the year.

When errors are found, ISIS personnel check the submitted data form, and as necessary also examine the institution's inventory report, acquisition/release report, and the ISIS file of previous data forms submitted by the institution. The cause of the error is identified and either corrected by ISIS personnel or returned to the submitting institution for correction.

3. Information Distributed by ISIS.

The Inventory System provides three reports to all participants annually. These are the institution's Inventory Report, its Acquisition/Release Report, and the ISIS Species Distribution Report. Because of sheer volume (the Species Distribution Report alone is approaching 3,000 pages) this report is provided on microfiche. Hard copy of the Species Distribution Report can be ordered from ISIS by prior arrangement, and ISIS will provide participants with hard copy of small portions of these reports at no charge. Previous surveys of ISIS participants indicated that most had access to a microfiche reader or lab microscope.

The ISIS Species Distribution Report, providing information on the holdings of all ISIS participants, has been growing at an average rate of about 30% per year. The numbers of mammals and birds on which participants have received information is shown in Figure 2. The mid-year 1979 Species Distribution Report, being produced as this report is released, is expected

to provide information on about 43,000 living captive mammals and birds.

ISIS participants receive the Species Distribution Report along with their own institution's Inventory Report and Acquisition/Release Report annually, as part of ISIS normal services. More up-to-date reports are available on a quarterly or semi-annual basis, for a fee of \$50 each. In Fiscal Year 1979, twenty ISIS participants requested such quarterly or semi-annual reports.

4. Information Quality Improvement.

One of the long-term benefits ISIS returns to participants is a significant improvement in the quality of information known about captive animal populations. One example is shown as Figure 3, "Origin of Animals on ISIS Inventory". A minimal understanding of captive animal populations requires knowing where they come from. As Figure 3 shows, more and more of the mammals and birds held by ISIS participants have known origins (now more than 80% of the mammals, and more than 60% of the birds). Furthermore, a very large majority of all animals on inventory were captive born.

Further improvements in information quality are achieved when animals can be traced as individuals when they move between institutions. Outside of ISIS, only studbook species can usually be so traced. For ISIS institutions, such tracing is possible if the linkage data is provided to ISIS. This requires Vendor institution code and Vendor Specimen ID information, and the same for recipient when possible. These data items are not mandatory for ISIS participants, and they are provided to ISIS some, but not all, of the time. ISIS PDS capabilities need such linkage data to provide all of the benefits possible from ISIS participation. Institutions need to be strongly encouraged to submit this information to ISIS.

5. ISIS Directories

ISIS currently provides participants with four volumes of directories; the World Geographical and Zoological Institution Directory, the Mammalian Taxonomic Directory, and Volumes I and II of the Avian Taxonomic Directory. These directories provide numeric computer codes for holding institutions and for animal taxa, and are a critical part of the ISIS system.

The World Geographical and Zoological Institution Directory provides codes for several thousand animal-holding facilities. As these facilities change names, move, cease operations, or as new ones are started, modifications to the directory are needed. ISIS provides updates to participants, as Supplements to this directory. The first Supplement was distributed to participants in May 1978 with about 100 changes/additions/deletions. A similar supplement list has been growing during Fiscal Year 1979, and plans are to distribute another Supplement this year.

The ISIS Taxonomic Directories also require maintenance. They are not intended to reflect the latest revision of a group's

classification, but rather are a dictionary that permits assigning numeric codes to taxa in a relatively easy way. Nonetheless, changes will occur. Suggestions received by ISIS for modifications of these Taxonomic Directories are reviewed by ISIS and also forwarded to the AAZPA-ISIS Committee for their comments and advice. As necessary, taxonomic supplements will be issued.

6. ISIS Participation.

During Fiscal Year 1979, one participant withdrew from ISIS, while six others joined and are submitting data. Commitments of participation, but no data, have been received from four others.

A review of participants and their status is presented as Table 1. Those joining and terminating are listed as Table 2. A graph of the trend in the number of institutions actually submitting data on mammals and on birds is presented as Figure 4. This shows clearly that the ISIS data base is becoming more and more comprehensive.

Other participation figures have been used in various ways in the past, and may have caused some confusion. ISIS has several "participants" who pay the annual minimum \$100 fee in order to receive the directories and updates or to receive the Species Distribution Report. They do not submit data, in some cases because they have no animals!

Further, at any given time, there are always "participants" who have not submitted data within the last twelve months. Personnel changes, fiscal crises, etc. are often the cause. These institutions have appeared in the list of participants (Table 1) but they are not counted in the graph of data-submitting participants if they did not submit data in the indicated year (Figure 4).

Table 1

ISIS Participants - Invoiced for 1978 Participation Fee

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic.Code	Participation Code
\$ 220.00	\$ 206.00	X	X	2	Abilene Zoological Gardens, Abilene, Texas
100.00	NO	X		3	African Lion Safari, Rockton, Ontario, Canada
100.00					Arizona - Sonora Desert Museum, Tucson, Arizona - DROPPED
100.00	100.00	X		1	Atlanta Zoological Park, Atlanta, Georgia
	NO	X		3	Audubon Park Zoo, New Orleans, Louisiana
	NO			0	Avian Behaviour Laboratory, Winnipeg, Manitoba, Canada
559.00	479.00	X	X	3	Baltimore Zoo, Baltimore, Maryland
137.00	NO	X	X	1	Beardsley Zoological Gardens, Bridgeport, Connecticut
340.00	383.00	X	X	3	Birmingham Zoo, Birmingham, Alabama
238.00	272.00				Boston Zoological Society, Dorchester, Massachusetts (3 Zoos)
		X		2	Franklin Children's Zoo
		X	X	3	Franklin Park Zoo
		X		2	Walter D. Stone
	NO			0	Breedmore Inc., Shohola, Pennsylvania
564.00	619.00	X	X	3	Buffalo Zoological Gardens, Buffalo, New York

Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic.Code	Participation Code
\$ 230.00	\$ 212.00	X	X	3	Burnet Park Zoo, Syracuse, New York
904.00	919.00	X		3	Busch Gardens, Tampa, Florida
100.00	100.00	X		3	Caldwell Children's Zoo, Tyler, Texas
492.00	565.00	X	X	3	Calgary Zoo and Natural History Park, Calgary, Alberta, Canada
		X		3	Camp Cooley Ranch, Franklin, Texas, (Prepaid \$100.00 for 1979)
	100.00			0	Canyon Colorado Equid Sanctuary, Colorado Springs, Colorado
100.00	NO	X		3	Carlos Avery Wildlife Management Area, Forest Lake, Minnesota
100.00	100.00	X	X	2	Cen-Tex Zoo, Waco, Texas
100.00	100.00	X		3	Cheetahs Unlimited (Frank Gilbert), Phoenix, Arizona
458.00	435.00	X		3	Cheyenne Mt. Zoo, Colorado Springs, Colorado
999.00	NO	X	X	3	Chicago Zoological Park, Brookfield, Illinois
571.00	710.00	X	X	3	Cincinnati, Zoological Society of, Cincinnati, Ohio
315.00	367.00	X		3	Cleveland Metroparks Zoological Park, Cleveland, Ohio
158.00	205.00	X		3	Copenhagen Zoologisk Have, Copenhagen, Denmark
	100.00	X		2	Crown Animal Sales, San Lorenzo, California
158.00	120.00	X		3	Dade County Zoological Park, Miami, Florida
1,425.00	1,360.00	X	X	2	Denver Zoological Gardens, Denver, Colorado

0 - No data submitted
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 3 - Update regularly
 4 - Entering only portion of inventory

Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic.Code	Participation Code
\$	\$ 100.00	X		3	Detroit Zoological Park, Royal Oak, Michigan
NO	NO	X		1	Dickerson Park Zoo, Springfield, Missouri
		X		3	Dreher Park Zoological Garden, West Palm Beach, Florida (Prepaid 1978 \$100.00)
260.00	291.00	X		3	Duke University Primate Facility, Durham, North Carolina
123.00	128.00	X		2	Duluth Zoo, Duluth, Minnesota
NO	100.00	X		1	Ellen Trout Park Zoo, Lufkin, Texas
100.00	100.00	X		1	El Paso Zoological Park, El Paso, Texas
100.00	100.00	X	X	3	Erie Zoo, Erie, Pennsylvania
257.00	280.00	X	X	3	Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
580.00	501.00	X	X	3	Fort Worth Zoological Park, Fort Worth, Texas
812.00	805.00	X	X	3	Gladys Porter Zoo, Brownsville, Texas
109.00	115.00	X	X	3	Glen Oak Zoo, Peoria, Illinois
	100.00	X		3	Granby, Societe Zoologique de, Granby, Quebec
457.00	552.00	X	X	3	Greater Baton Rouge Zoo, Baton Rouge, Louisiana
464.00	440.00	X	X	3	Henry Doorly Zoo, Omaha, Nebraska
100.00	100.00	X		1	Henry Vilas Park Zoo, Madison, Wisconsin
153.00	150.00	X		2	Highland Park Zoo, Pittsburgh, Pennsylvania

Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic.Code	Participation Code
NO	NO	X		1	Hogle Zoological Garden, Salt Lake City, Utah
NO	\$ 504.00	X		3	Houston Zoological Gardens, Houston, Texas
\$ 261.00	251.00	X	X	2	Jackson Zoological Park, Jackson, Mississippi
491.00	535.00	X	X	3	Jacksonville Zoological Park and Society, Jacksonville, Florida
181.00	190.00	X		3	Jardin Zoologique de Quebec, Quebec, Canada
	100.00	X		4	Jersey Wildlife Preservation Trust, Jersey, British Isles
169.00	169.00	X	X	2	Kemper Zoological Park, Hattiesburg, Mississippi
396.00	396.00	X	X	1	Kansas City Zoological Gardens, Kansas City, Missouri
100.00	100.00	X		2	Kings Dominion (Lion Country Safari), Doswell, Virginia
249.00	292.00	X	X	3	Kings Island, Kings Mills, Ohio
220.00	268.00	X		2	Knoxville Zoological Park, Knoxville, Tennessee
NO	NO			0	Las Vegas Valley Zoo, Las Vegas, Nevada (Halted operations)
NO	NO	X		1	Lee Richardson Zoo, Garden City, Kansas
NO	100.00	X		1	Lincoln Children's Zoo, Lincoln, Nebraska
130.00	138.00	X		2	Lincoln Municipal Zoo, Lincoln, Nebraska
907.00	870.00	X		3	Lincoln Park Zoo, Chicago, Illinois
188.00	194.00	X		2	London, Zoological Society of (and Whipsnade), London, England
251.00	756.00	X		3	Los Angeles Zoo, Los Angeles, California

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Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic. Code	
\$ 251.00	\$ 225.00	X		1	Louisville Zoological Garden, Louisville, Kentucky
	NO	X	X	3	Marineland of Florida, St. Augustine, Florida
405.00	392.00	X	X	3	Mesker Park Zoo, Evansville, Indiana
1,737.00	1,747.00	X	X	3	Metro Toronto Zoo, West Hill, Ontario, Canada
100.00	100.00	X	X	3	Miller Park Zoo, Bloomington, Illinois
1,058.00	1,084.00	X	X	3	Milwaukee County Zoo, Milwaukee, Wisconsin
130.00	624.00	X	X	3	Minnesota Zoological Garden, Apple Valley, Minnesota
136.00	136.00	X	X	3	Montgomery Zoo, Montgomery, Alabama
1,426.00	1,446.00	X	X	3	National Zoological Park, Washington, D.C.
236.00	332.00	X	X	3	National Zoological Park Conservation Center, Front Royal, Virginia
157.00	297.00	X	X	3	National Zoological Park Office of Zoological Research, Washington, D.C.
NO	100.00	X	X	3	Natural Science Center, Greensboro, North Carolina
100.00	100.00	X	X	3	New England Aquarium, Boston, Massachusetts
1,472.00	1,448.00	X	X	3	New York Zoological Society, Bronx, New York
74.00	132.00	X	X	3	New York Zool. Society St. Catherines Survival Center, St. Cath. Isl., GA
100.00	100.00	X	X	3	North Carolina Zoological Park, Asheboro, North Carolina
727.00	998.00	X	X	3	Oklahoma City Zoo, Oklahoma City, Oklahoma
1,041.00	1,087.00	X	X	3	Philadelphia Zoological Garden, Philadelphia, Pennsylvania

Participation Code

- 0 - No data submitted
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- 3 - Update regularly
- 4 - Entering only portion of inventory

Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic. Code	Participation Code
\$ 178.00	\$ NO	X		1	Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
130.00	NO	X		1	Racine Zoological Park, Racine, Wisconsin
100.00	100.00	X	X	3	Ralph Mitchell Zoo, Independence, Kansas (Riverside)
201.00	219.00	X		3	Rio Grande Zoo, Albuquerque, New Mexico
613.00	694.00	X	X	3	Riverbanks Zoological Park, Columbia, South Carolina
182.00	NO	X	X	3	Roeding Park Zoo, Fresno, California
100.00	100.00	X		2	Roger Williams Zoo, Providence, Rhode Island
NO	100.00	X		1	Roosevelt Park Zoo, Minot, North Dakota
632.00	1,429.00	X	X	3	St. Louis Zoological Park, St. Louis, Missouri
168.00	NO	X	X	1	St. Paul's Como Zoo, St. Paul, Minnesota
188.00	207.00	X		2	Sacramento Zoo, Sacramento, California
300.00	308.00	X	X	3	Salisbury Zoo, Salisbury, Maryland
236.00	269.00	X	X	2	San Antonio Zoological Gardens, San Antonio, Texas
1,069.00	1,219.00	X		3	San Diego Wild Animal Park, San Diego, California
2,477.00	2,440.00	X	X	3	San Diego Zoological Gardens, San Diego, California
511.00	NO	X	X	3	San Francisco Zoo, San Francisco, California
128.00	274.00	X	X	2	Santa Barbara Zoological Gardens, Santa Barbara, California
120.00	NO	X	X	1	Santa Fe Community College Teaching Zoo, Gainesville, Florida

0 - No data submitted
 1 - No data received within last 12 months
 2 - Update annually or semi-annually
 3 - Update regularly
 4 - Entering only portion of inventory

Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic.Code	Participation Code
\$ 9.00	\$ NO	X		1	Seafloor Aquarium, Nassau, Bahamas
NO	100.00			0	Seattle Aquarium, Seattle, Washington
201.00	219.00	X	X	3	Sedgwick County Zoo, Wichita, Kansas
335.00	389.00	X	X	3	Seneca Park Zoo, Rochester, New York
100.00	100.00	X		1	John G. Shedd Aquarium, Chicago, Illinois
104.00	143.00	X		3	South Bend Zoo, South Bend, Indiana (Potawatomi)
750.00	769.00	X		2	Stichting Koninklijke Rotterdamse Diergaarde, Rotterdam, Netherlands
NO	NO			0	Terry Lou Zoo, Scotch Plains, New Jersey
268.00	308.00	X	X	3	Topeka Zoological Park, Topeka, Kansas
330.00	393.00	X	X	3	Tulsa Zoo, Tulsa, Oklahoma
360.00	NO	X	X	3	Turtle Back Zoo, West Orange, New Jersey
116.00	116.00	X		3	Utica Zoo, Utica, New York
NO	NO			0	Vancouver Public Aquarium, Vancouver, British Columbia
314.00	259.00	X	X	2	Walt Disney World, Lake Buena Vista, Florida
322.00	317.00	X	X	3	Washington Park Zoo, Portland, Oregon
	NO			0	Waters Ranches (Dan Waters), Mt. Home, Texas
100.00	100.00	X		1	Wild Canid Survival and Research Center, St. Louis, Missouri

Table 1 (continued)

1977 Participation Fee Paid	1978 Participation Fee Paid	Mammals	Birds	Partic. Code		<u>Participation Code</u>
\$ 422.00	\$ 682.00	X	X	3	Woodland Park Zoological Gardens, Seattle, Washington	0 - No data submitted 1 - No data received within last 12 months 2 - Update annually or semi-annually 3 - Update regularly 4 - Entering only portion of inventory
	100.00	X		1	Zoo of Artansas, Little Rock, Arkansas	

TABLE 2

CHANGES IN ISIS PARTICIPATION

(a)

NEW PARTICIPANTS, SUBMITTING DATA

Audubon Park Zoo, New Orleans, Louisiana
Camp Cooley, Franklin, Texas
Crown Animal Sales, Danville, California
Dreher Park, West Palm Beach, Florida
Lincoln Children's Zoo, Lincoln, Nebraska
Societe Zoologique de Granby, Quebec, Canada

NEW PARTICIPANTS, NO DATA RECEIVED

Avian Behavior Labs, University of Manitoba, Winnipeg, Canada
Breedmore, Shohola, Pennsylvania
Canyon Colorado Equid Sanctuary, Wagon Mount, New Mexico
Society of Scientific Care, Inc., San Diego, California

(b)

DISCONTINUING PARTICIPATION

Arizone Sonora Desert Museum, Tucson, Arizona

III. OPERATIONS - INVENTORY SYSTEM (continued)

B. Operations Budget Review

1. Fiscal Year 1979

The activities involved in the daily operation of the ISIS Inventory System require the majority of staff time. Hence both full-time positions, as well as associated data processing, printing, postage, supplies, equipment, travel, and etc., are charged to the operations budget.

It remains an ISIS objective to cover operating costs from income derived from participation fees, special reports and directory sales. This objective has never been reached, and the trend is unclear. In Fiscal Year 1977, 60% of the operations cost was met by participation fees. In Fiscal Year 1978, this percentage rose to 75%. However, for Fiscal Year 1979, this percentage fell to 67%.

This decline in Fiscal Year 1979 is almost entirely due to an increase in the amount of participation fees not paid by the end of the fiscal year, over three months after billing. 108 ISIS participants were invoiced on 5 March 1979 for the 1978 ISIS participation fee. By 13 June 1979, 83 had paid. The remaining 25 were sent a reminder letter and a copy of the original invoice on 13 June. As of 31 Aug., 14 more have paid. \$6,837 was not paid at the close of Fiscal Year 1979. If payments had been as prompt as the previous year, participants would have paid 74% of ISIS operations costs. Hypothetically, if ISIS received all of participant's fees by the end of each fiscal year, such fees would have covered 77% of ISIS operations costs in Fiscal Year 1979.

The remainder of ISIS operations income was derived from sales of directories and miscellaneous (3.4%), carryover of operations income from Fiscal Year 1978 (12%), and from an AAZPA loan of \$20,000 to ISIS which was used to make up the final 18% of needed operations income for FY 1978.

It is important to examine ISIS operations costs and their rate of increase as a preliminary to arriving at a long-term solution to generating ISIS operations income. Detailed budget information which separates operating and development costs is included in ISIS Annual Reports for Fiscal Years 1977, 1978, and this year, 1979. Using these figures, and information from the ISIS Species Distribution Reports for the close of each fiscal year, the trend in costs per animal on inventory can be established.

Operations costs rose about 12% from 1977 to 1978, and about 6% from 1978 to 1979. However, the ISIS Inventory for these years rose by 30% and 9% respectively.

As shown below, the result is declining operations costs per animal on inventory. If these figures were adjusted to constant dollars to correct for inflation, they would show an even greater decline in cost.

FISCAL YR.	OP. COSTS	INVENTORY	COST PER ANIMAL	INCOME PER ANIMAL		
				PARTICIPANTS	AAZPA	NET
1977	\$45,096	\$30,900	\$1.46	\$0.86		-\$0.60
1978	\$50,855	\$40,054	\$1.27	\$0.98	\$0.37	+\$0.08
1979	\$53,936	\$43,500	\$1.24	\$0.83	\$0.46	+\$0.05

The 1977 operations loss was covered out of development funds, to which the smaller operations surplus from 1978, and part of that from 1979, was returned. The operations income from the AAZPA in 1979 was a loan of \$20,000. Paying back this loan would change the net on 1979 operations from +\$0.05 per animal to -\$0.39.

Operations budgets for Fiscal Year 1979 are presented in Tables 3 and 4.

Operations budgets reflect only the cost of providing the same ISIS services as in the past. They are "bare bones" budgets. Inflation, plus some computer costs which rise as the inventory grows, make it unrealistic to project further decrease in the cost per animal on inventory.

A pictorial view of ISIS funding and its sources, over the organization's history, is presented as Figure 5.

2. Fiscal Year 1980 (1 July 1979 to 30 June 1980)

Because the ISIS Fiscal Year runs from 1 July to 30 June, but participant fee income does not arrive until about eight months into the fiscal year, ISIS needs a substantial amount (about \$30,000) of operations capital to start each fiscal year. This year this capital will be provided by a \$20,000 grant from the AAZPA (to be received as five monthly installments of \$4,000 each, beginning August 1979) plus approximately \$7,500 carry-over of operations funds from Fiscal Year 1978.

Modest further operations funds will come from contracts ISIS has with the Interagency Primate Steering Committee. The first contract, on which ISIS has completed its obligations, was expected in Fiscal 1979, but will now arrive early in Fiscal 1980. \$1,000 from this contract will go into operations to cover added costs of inventory. A like amount from the second contract, expected to be formalized in Fiscal Year 1980, will also go to operations.

III. OPERATIONS - INVENTORY SYSTEM (continued)

B. Operations Budget Review (continued)

2. Fiscal Year 1980 (continued)

Projected operations budgets are presented in Tables 5 and 6. From projected expenses and projected income, it is anticipated that the ISIS Operations Budget will provide approximately \$10,000 net carryover into FY 1981. This is only slightly better than the position at the start of FY 1980, and is not sufficient to allow ISIS to function. Fiscal Year 1980 operations are permitted because of the \$20,000 grant from the AAZPA. Clearly, some similar dollar amount of additional income will be necessary in FY 1981.

On the other hand, substantial parts of both the Pedigree/Demography/Studbook subsystem and the Physiological Norms subsystem are in final testing stages, and are about to be operational. It is recommended that some relationship between ISIS and AAZPA and AAZV be arranged whereby ISIS provide reports from these subsystems in exchange for needed operations capital.

3. Fiscal Year 1981

Projected operations budgets for Fiscal Year 1981 are presented as Tables 6A and 6B. These projections are necessarily more tentative. They do show that ISIS operations expenses exceed income derived from participants and from operations-related aspects of outside contracts. Continuing support of the AAZPA at the same level will permit ISIS to function in Fiscal Year 1981.

TABLE 3

ISIS - OPERATIONS
INCOME FY 1979

<u>Source</u>	<u>Projected Income</u>	<u>Actual* Income</u>	<u>Variance</u>
Transferred from FY78	\$ 5,567.81	\$ 6,370.48	\$ 802.67
1977 Zoo Participation Fees Paid in Fiscal Year 1977 (\$3,077.00 not paid in FY78)	1,685.00	1,391.00	(294.00)
1978 Zoo Participation Fees (\$6,837.00 not paid in FY79)	41,000.00	34,553.00	(6,447.00)
Demand Reports	1,500.00	1,400.00	(100.00)
Directories	1,000.00	215.00	(785.00)
Miscellaneous	500.00	240.00	(260.00)
Interagency Primate Steering Committee Contract	5,750.00	0.00	(5,750.00) ¹
Pedigree/Demography/Studbook System	0.00	0.00	0.00
AAZPA Loan	<u>20,000.00</u>	<u>20,000.00</u>	<u>0.00</u>
	\$77,002.81	\$64,169.48	(\$12,833.33)

* Income figures are complete for FY79 and are not estimated.

¹ Interagency Primate Steering Committee Contract funds will be received in Fiscal Year 1980, instead of Fiscal Year 1979.

TABLE 4

ISIS - OPERATIONS
EXPENSES, FY 1979

<u>Budget Item</u>	<u>Projected Expenses</u>	<u>Actual Expenses</u>	<u>Variance</u>
Salaries and Fringe Benefits	\$ 32,500.00	\$31,000.00	(\$ 1,500.00)
Data Processing	18,000.00	12,436.27	(5,563.73)
Printing	4,000.00	2,575.00	(1,425.00)
Postage	2,500.00	1,230.00	(1,270.00)
Supplies	750.00	0.00	(750.00)
Repairs	200.00	243.85	43.85
Miscellaneous	100.00	0.00	(100.00)
Travel	4,000.00	3,900.00	(100.00)
Equipment Purchase	400.00	0.00	(400.00)
State Indirect Cost Billing	1,000.00	1,551.00	551.00
Old accounting error, billed by Auditors to FY 1975	<u>0.00</u>	<u>1,000.00</u>	<u>1,000.00</u>
	\$ 63,500.00	\$53,936.12	(\$10,397.29)
Operations Income FY 1979		\$64,169.48	
Operations Expenses FY 1979		<u>(53,936.12)</u>	
Operations balance at end of FY 1979		\$10,233.36	
Development and project deficit FY 1979		<u>(2,634.34)</u>	
Net carryover to FY 1980 (See Tables 8 and 9)		\$ 7,599.02	

TABLE 5

ISIS - OPERATIONS
INCOME FY 1980
PROJECTIONS

Source

Remaining funds transferred from FY 1979 Operations Budget	\$ 7,597.02
1977 Zoo Participation Fees (\$1,686 unpaid)	0.00
1978 Zoo Participation Fees (\$6,837 unpaid)	4,000.00
1979 Zoo Participation Fees (payable March 1980)	40,000.00 ¹
Demand Reports	1,500.00
Directories	750.00
Miscellaneous	300.00
Pedigree/Demography/Studbook System Demand Reports	0.00 ²
Physiological Norms and Institution Reports	0.00 ²
Interagency Primate Steering Committee Chimpanzee Inventory	2,000.00 ³
AAZPA Grant to ISIS	20,000.00
Payback from Development funds, for FY 1979 development deficit paid from operations budget in FY 1979	<u>2,634.34</u>
	\$78,789.36

¹ Expected invoice total is about \$43,500, from which \$40,000 might be paid to ISIS if return is somewhat better than FY 1979.

² These subsystems will be operational in Fiscal Year 1980, but policies for report production, distribution, and charges have not yet been developed.

³ This represents \$1,000 from each of two contracts, one completed and invoiced, the other not yet signed.

TABLE 11

 ISIS - DEVELOPMENT AND OTHER PROJECTS
 EXPENSES FY 1980 (1 July 1979 to 30 June 1980)

<u>Budget Item</u>	<u>Total Projected Expense</u>	<u>Project Specific</u>	<u>General Capability Enhancement</u>
Data Processing			
Inventory System (ISD)	\$ 2,000.00	\$ 0.00	\$ 2,000.00
PDS (U of M)	2,000.00	0.00	2,000.00
Phys Norms (U of M)	500.00	0.00	500.00
Keypunch and computer costs of Reptile and Amphibian Taxonomic Directory Masters	3,000.00	0.00	3,000.00
Printing Costs, Reptile and Amphibian Taxonomic Directories	8,000.00	0.00	8,000.00
Consultants			
Phys Norms	250.00	0.00	250.00
Herp. Taxonomy	500.00	0.00	500.00
Salaries			
Clerical Support for Chimp Project	10,000.00	10,000.00	0.00
Computer terminal purchase	2,500.00		2,500.00
Travel, chimp project	4,000.00	4,000.00	0.00
Travel, other	1,500.00	0.00	1,500.00
Data recording support for chimp project participants	10,000.00	10,000.00	0.00
MZG overhead costs, IMS grant	3,750.00	3,750.00	0.00
MZG overhead costs, chimps project II.	5,925.00	5,925.00	0.00
Major ISIS System Review/Report Additions/ Improvements	20,000.00		20,000.00
Payback to operations of 1979 development deficit	<u>2,634.34</u>	<u>2,634.34</u>	<u>0.00</u>
	\$76,559.34	\$36,309.34	\$40,250.00

FY 1981 PROJECTIONS - OPERATIONS EXPENSES

(6A)

<u>Budget Item</u>	<u>Projected Expense</u>
Salaries and Fringe Benefits	\$ 40,000
Data Processing	\$ 17,500
Printing	\$ 4,000
Postage	\$ 3,000
Supplies	\$ 1,000
Repairs	\$ 500
Miscellaneous	\$ 250
Travel	\$ 5,000
Equipment Purchase	\$ 2,000
State Indirect Costs Billing	\$ 2,250
	<u>\$ 75,500</u>

FY 1981 PROJECTIONS - OPERATIONS INCOME

(6B)

<u>Source</u>	
Carryover from FY 1980	\$ 10,000
1980 Participation Fees	\$ 45,000
Demand Reports	\$ 2,000
Directories	\$ 1,000
Miscellaneous	\$ 300
ISIS-AAZV Phys Norms Contract	\$ 5,000
Interagency Primate Steering Committee Continued Contract, Inventory Income	\$ 3,000
AAZPA Grant to ISIS	\$ 20,000
	<u>\$ 86,300</u>
Carryover to FY 1982	\$ 10,800

IV. DEVELOPMENT AND OTHER ISIS PROJECTS

A. Activity Review

Developmental and other activities are those which are above and beyond minimum operations of the ISIS System. There are four such projects underway:

1. Chimpanzee Project, for the Interagency Primate Steering Committee. Phase one of this project, acquisition of data on current inventory animals from approximately 25 non-zoo chimpanzee holding institutions, has been completed. A report was presented to the Steering Committee by Dr. Seal on 5 June 1979. ISIS has met its obligations under the existing contract and expects payment soon. Phase two, acquisition of historical data and updating/editing current data, will begin as soon as the contract is completed. A list of chimpanzee project participants is included as Table 7.
2. Pedigree/Demography/Studbook Subsystem. This project has been partially completed. Population history reports, birth sex ratio and birth/death seasonality reports, and three different formats of studbook-like reports can now be produced for any animals entered into ISIS under one taxonomic code. These reports have been produced for 12 mammalian taxa and 2 avian taxa as part of final testing. They have been distributed to ten interested participants for checking and evaluation. Initial response has been very favorable. A few format bugs remain, others have been corrected. These reports point out the importance of participants submitting Vendor/Recipient Institution Codes and Specimen ID data, as otherwise these reports are tantalizing, but incomplete.

Further capabilities of this subsystem will include detailed demographic analysis and inbreeding coefficient calculation. Work continues on these.

3. Physiological Reference Data Subsystem (Phys Norms). Programming has been completed for this subsystem, and data collection from the eleven "pilot project" zoos is underway. As of this date, approximately 1,500 data forms have been received by ISIS, from six institutions, over the last four months (See Figure 6). Editing and data entry are now underway. The problem areas identified so far are resistance to use of metric weights, Celsius temperatures, and failure to calculate absolute white cell counts. A trial Phys Norms Report plus institution reports will be produced prior to the October AAZV meetings, based on available corrected data.
4. Reptile and Amphibia Taxonomic Directories. Work on this important project has been delayed because ISIS staff simply did not have the time to assign taxonomic codes and common names. However, Dr. Seal has volunteered to assign the taxonomic codes, and Judith Block, Chair of the AAZPA-ISIS Committee, has volunteered to find and coordinate volunteers to assign common names and ranges as deemed desirable.

The basic taxonomic list was provided by the U. S. Fish and Wildlife Service, and obtained for ISIS by Dr. Wayne King. Forms for assignment of codes and names are being generated by computer.

Once the taxonomic codes and common names/ranges have been assigned, the list will be keypunched and a master directory printed. Funds to support the work this far are available from the U.S.D.I. Funds to support the costs of printing 100-200 copies of each directory will have to be come from elsewhere.

B. Development Budget Review

1. Fiscal Year 1979 (1 July 1979 to 30 June 1979)

ISIS development funds in Fiscal Year 1979 were anticipated from two sources, carryover from FY 1978 and support for the reptiles/amphibians taxonomic directory from the U. S. Department of Interior.

Very slow progress on the reptile and amphibian taxonomic project meant that ISIS did not invoice for the available development monies in FY 1979. This has now been done, and the money will be developmental income for FY 1980.

Developmental expenses were somewhat higher on most items than projected, but the expected \$12,000 in printing costs for taxonomic directories was not spent.

Development budgets for FY 1979 are presented as Tables 8 and 9.

2. Fiscal Year 1980

ISIS development and other projects funds for FY 1980 will be very substantial. ISIS has received \$25,000 from the Institute of Museum Services for a one-time project which will result in benefits to all users. Many ISIS system modifications will be explored and implemented. In addition, a substantial contract with NIH Interagency Primate Steering Committee will support ISIS acquisition and editing of all available data on U.S. chimpanzees, including those now alive and those of historical importance. This contract also requires that ISIS provide sophisticated analysis of the collected data, such analytical capabilities will provide benefits to all other ISIS participants as well. This contract is split three ways in the FY 1980 budget, to show ordinary inventory costs for the added chimpanzees as well as provision of ordinary ISIS services and reports

TABLE 7

CHIMPANZEE FACILITIES PARTICIPATING IN INVENTORY

Aero Space Research Laboratories, AMRL-VS, Patterson AFB, Ohio

Center For Disease Control, Atlanta, Georgia

Delta Primate Research Center, Covington, Louisiana

Dept. of Psychiatry, Stanford Univ., Stanford, California

FDA Bureau of Biologics, Bethesda, Maryland

Gulf South Research Institute, New Iberia, Louisiana

Hepatitis Laboratories, National Communicable Disease Center, Phoenix, Arizona

Institute for Primate Studies, Univ. of Oklahoma, Norman, Oklahoma

International Center of Environmental Safety, Holloman, New Mexico

Jungle Larry's Safari Island, Sandusky, Ohio

Jungle Larry's Safari Land Inc., Naples, Florida

Laboratory for Experimental Medicine and Surgery in Primates, New York, New York

Lion Country Safari, West Palm Beach, Florida

Litton Bionetics, Kensington, Maryland

Meloy Laboratories, Rockville, Maryland

Merck, Sharp and Dohme Research Laboratories, West Point, Pennsylvania

Miami Monkey Jungle, Miami, Florida

Naval Medical Research Institute, Bethesda, Maryland

NINCDS Primate Colony, Frederick Cancer Research Center, Ft. Detrick, Maryland

Noell's Ark Chimp Farm, Tarpon Springs, Florida

Primate Foundation of Arizona, Tempe, Arizona

Southwest Foundation for Research and Education, San Antonio, Texas

Univ. of Texas System Cancer Center, Bastrop, Texas

Walter Reed Army Institute of Research, Washington, D.C.

Yerkes Primate Research Center, Atlanta, Georgia

to the Chimpanzee project participants. \$30,000.00 is expected to be expended in the effort of recording, collecting, and entering into ISIS available information on living and historical animals whose records can be found. ISIS would support data recording at some institutions, ISIS personnel would travel to some others, and there would be a substantial increase in ISIS clerical work, to be covered by these funds. The \$30,000.00 is therefore listed as project funds. This would leave about \$8,500.00 to meet other ISIS obligations, including analysis of the chimpanzee population data. Analysis will require further expansion of ISIS PDS capabilities, but the expanded capabilities will benefit other ISIS participants. Therefore, these funds are listed as developmental income.

Together these two sources of funds will result in very real growth of ISIS services and capabilities.

3. Fiscal Year 1981

ISIS development and other projects for FY 1981 are expected be more modest, but it is expected that available funding will permit continued growth of information services provided by ISIS. Projects planned include new PDS reports and better methods for updating and maintaining the ISIS Directories. Projected budgets for FY 1981 Development and Other Projects are shown in Tables 12 and 13.

TABLE 8
 ISIS - DEVELOPMENT INCOME
 FY 1979 (1 July 1978 - 30 June 1979)

<u>Source</u>	<u>Projected Income</u>	<u>Actual Income</u>	<u>Variance</u>
Transferred from FY 1978	\$15,897.06	\$15,897.06	\$ 0.00
U.S.D.I.	\$10,000.00	\$ 0.00	\$10,000.00
	<u>\$25,897.06</u>	<u>\$15,897.06</u>	<u>-\$10,000.00</u>

TABLE 9
 ISIS - DEVELOPMENT EXPENSES
 FY 1979 (1 July 1978 - 30 June 1979)

<u>Budget Item</u>	<u>Projected Budget</u>	<u>Actual Budget</u>	<u>Variance</u>
Data Processing			
Phys Norms - ISD	\$ 3,000.00	\$ 3,808.70	-\$ 808.70
Phys Norms - U of M	\$ 1,391.96	\$ 544.70	+\$ 847.26
PDS - U of M	\$ 5,000.00	\$ 8,288.22*	-\$3,288.22*
Printing Taxonomies	\$12,000.00	\$ 0.00	+\$12000.00
Consultants			
Phys Norms - Scobie	\$ 700.00	\$ 700.00	\$ 0.00
PDS - Flesness	\$ 500.00	\$ 2,500.00	-\$2,000.00
Salaries			
6 months ½ time typist	\$ 2,305.10	\$ 1,244.78	+\$1,060.32
Computer terminal rental	<u>\$ 1,000.00</u>	<u>\$ 1,445.00</u>	<u>-\$ 445.00</u>
	\$25,897.06	\$18,531.40	+\$7,365.66

Developmental Income, Fiscal Year 1979 \$15,897.06
 Developmental Expenses, Fiscal Year 1979 \$18,531.40*
 Developmental Deficit, Fiscal Year 1979 -\$ 2,634.34*

*Developmental expenses for FY 1979 include chimp contract I PDS costs, for which income was not received in FY 1979. Payment in FY 1980 will be transferred to compensate the operations budget for this temporary deficit billed to it. Future budgets (see FY 1980 projected budget) will separate "development" funds into those which will be spent only to fulfill contract obligations and those which will contribute to a general growth and improvement of ISIS to the benefit of all participants.

TABLE 10

ISIS - DEVELOPMENT AND OTHER PROJECTS
 INCOME FY 1980 (1 July 1979 to 30 June 1980)
 PROJECTIONS

<u>Source</u>	<u>Projected Income</u>	<u>Project Specific</u> ¹	<u>General Capability Enhancement</u> ²
U.S.D.I.	\$ 10,000.00		\$ 10,000.00
Interagency Primate Steering Committee Contract I.	4,750.00	\$ 2,750.00	2,000.00
Interagency Primate Steering Committee Contract II. *	38,500.00*	30,000.00*	8,500.00*
AAZV Phys Norms Contract	3,000.00	1,500.00	1,500.00
Institute of Museum Services Grant **	25,000.00 **		25,000.00 **
	<hr/> \$81,250.00	<hr/> \$34,250.00	<hr/> \$ 47,000.00

* Contract II is successfully formalized with the Interagency Primate Steering Committee.

** ISIS received notice of award of this grant on 10 September, 1979.

¹ Project specific funds are those which will be received but will provide benefits only to the fund source.

² General capability enhancement funds are those which will be received from one source but will result in benefits to many or all other ISIS participants. An example is production of the Reptile and Amphibian Taxonomic Directory for the U.S.D.I.

TABLE 11

 ISIS - DEVELOPMENT AND OTHER PROJECTS
 EXPENSES FY 1980 (1 July 1979 to 30 June 1980)

<u>Budget Item</u>	<u>Total Projected Expense</u>	<u>Project Specific</u>	<u>General Capability Enhancement</u>
Data Processing			
Inventory System (ISD)	\$ 2,000.00	\$ 0.00	\$ 2,000.00
PDS (U of M)	2,000.00	0.00	2,000.00
Phys Norms (U of M)	500.00	0.00	500.00
Keypunch and computer costs of Reptile and Amphibian Taxonomic Directory Masters	3,000.00	0.00	3,000.00
Printing Costs, Reptile and Amphibian Taxonomic Directories	8,000.00	0.00	8,000.00
Consultants			
Phys Norms	250.00	0.00	250.00
Herp. Taxonomy	500.00	0.00	500.00
Salaries			
Clerical Support for Chimp Project	10,000.00	10,000.00	0.00
Computer terminal purchase	2,500.00		2,500.00
Travel, chimp project	4,000.00	4,000.00	0.00
Travel, other	1,500.00	0.00	1,500.00
Data recording support for chimp project participants	10,000.00	10,000.00	0.00
MZG overhead costs, IMS grant	3,750.00	3,750.00	0.00
MZG overhead costs, chimps project II.	5,925.00	5,925.00	0.00
Major ISIS System Review/Report Additions/ Improvements	20,000.00		20,000.00
Payback to operations of 1979 development deficit	<u>2,634.34</u>	<u>2,634.34</u>	<u>0.00</u>
	\$76,559.34	\$36,309.34	\$40,250.00

TABLE 12

ISIS - DEVELOPMENT AND OTHER PROJECTS
EXPENSES FY 1981 (1 July 1980 to 30 June 1981)

<u>Budget Item</u>	<u>Total Projected Expense</u>	<u>Project Specific</u>	<u>General Operations Enhancement</u>
Salary/benefits	\$17,750	\$10,000	\$ 7,750
Data Processing	2,500	0	2,500
Computer equipment	2,500	0	2,500
Travel	3,500	2,000	1,500
MZG overhead costs	<u>3,750</u>	<u>3,750</u>	<u>0</u>
	<u>\$30,000</u>	<u>\$15,750</u>	<u>\$14,250</u>

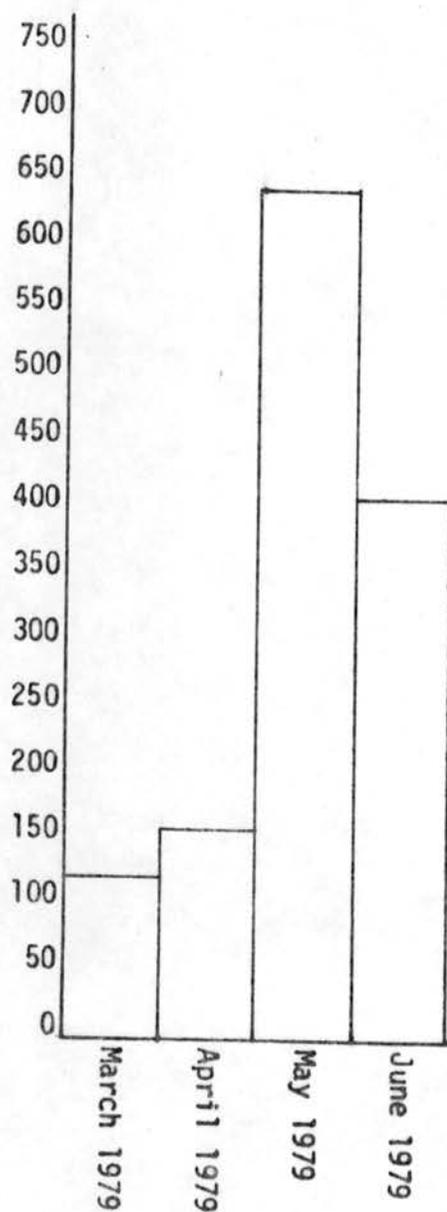
TABLE 13

ISIS - DEVELOPMENT AND OTHER PROJECTS
INCOME FY 1981 (1 July 1980 to 30 June 1981)

<u>Source</u>	<u>Projected Amount</u>
Interagency Primate Steering Committee, continued contract	\$30,000

FIGURE 6

LABORATORY DATA FORMS
RECEIVED FOR TRIAL RUN



V. RECOMMENDATIONS

ISIS Inventory Operations have always run at a deficit, requiring transfer of development funds, or support from the AAZPA, to make up the difference.

However, operations costs for the basic ISIS services seem well controlled, and have in fact declined in terms of cost per animal on inventory. New ISIS services have now become available; development is essentially completed on the Phys Norms Subsystem and on a substantial portion of the PDS Subsystem. Both subsystems are now in final testing and can be operational this fall.

ISIS will thus have the capability of providing information to help participants with particular biological and management problems. From a medical viewpoint, the Phys Norms subsystem will provide an orderly and edited summary of the institution's own animals and their physiological histories, and in addition, a summary of collected ISIS information on normal values and ranges for physiological laboratory data.

It is recommended that ISIS and the AAZV explore a contractual arrangement whereby ISIS collect, edit, and process Physiological Laboratory Data Forms, produce reports at desirable intervals, and in return receive financial support for this operation, from the AAZV. Operation of the Phys Norms Subsystem requires that the institution and taxonomic lists of the inventory system be current, so a modest part of the contract support for Phys Norms would appropriately be spent on inventory system maintenance.

ISIS has substantial additional capabilities through the PDS Subsystem. For any desired taxa, ISIS can produce, on demand, a series of reports which are as current as the ISIS data base, probably 30 to 60 days behind events. This report series includes birth sex ratio, birth and death seasonality, population history (captive births, captive deaths, ISIS census size, direct wild acquisitions), and three variants of the studbook-like report, which give detailed history and reproductive data for all animals entered into ISIS under the desired taxonomic code. These reports can serve as the basis for management planning, starting studbooks, finding animals of appropriate age, sex, and reproductive history for acquisition, etc.

It is recommended that ISIS and the AAZPA explore a contractual arrangement whereby ISIS produce PDS reports in exchange for continuing AAZPA contractual support. Operation of the PDS Subsystem is entirely dependent on the data collection of the inventory system, and thus it is appropriate that some portion of the contract funds support inventory operations. PDS reports produced by ISIS could be provided to the AAZPA, sent directly to requesting participants, or some other alternative. Policies for access, copy costs, production schedules, etc., would need discussion. The recommended number of taxa treated by the PDS subsystem each year under the contract would be in the neighborhood of 50.



Gerry

American Association of Zoological Parks and Aquariums

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15 August 1978

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Catskill, New York 12414

U. S. Seal, Ph.D.
Minnesota Zoological Garden
12101 Johnny Cake Road
Apple Valley, MN 55124

Dear Ulie:

Please know that we have received the 1978 ISIS Annual Report complete with recommendations for the Board of Directors.

It is our hope to mail to each of the Directors a packet of the committee reports 10-12 days prior to the Board meeting to accord them an opportunity to study the committee reports.

As per your request, you and Jan will be appearing before the Board to discuss your report and to receive input and guidelines from the Board of Directors.

On behalf of the AAZPA Board of Directors, I express to you my sincere appreciation for the completeness of your report. I am looking forward to seeing both you and Jan in Denver.

Most sincerely,

Rob.
Robert O. Wagner
Executive Director

ROW/br

Copies to: Dennis A. Meritt, Jr.
William E. Meeker

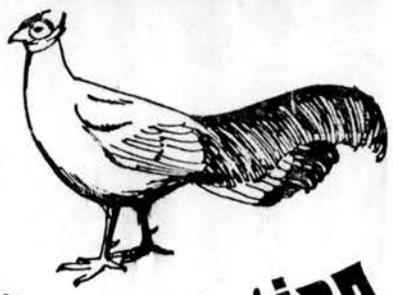
Seal
G.H.

Isis RECORD KEEPING

by U.S. Seal, Ph.D. and J.M. Olsen
ISIS, Minnesota Zoological Garden

Present day zoos and private breeders face the task of establishing and maintaining multigeneration, self-reproducing populations of captive wild species. In some instances these captive populations provide the only reservoir for species on the verge of extinction or already extinct in the wild. The greatly reduced availability of wild birds has resulted in an increased interest in sustained captive breeding programs. Considering that perhaps 700-800 species of wild birds are being bred in captivity and that these are dispersed among perhaps 10,000 or more breeders, and that replacements are increasingly difficult to obtain, then there is an obvious need for minimum record keeping standards and a means of pooling, collating and sharing basic data for captive population management of each species or subspecies. This is a challenge with high stakes including the complete loss of species when they become extinct

Gamebirds



Breeder's Listing

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Guy Hughes
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Everett Judge
Sonora, CA.

K.C. Lint
San Diego, CA.

Art Risser
Curator of Birds
San Diego Zoo

Frank Strange
Torrance, CA.

Frank Todd
Corp. Curator of Birds
Sea World, San Diego, CA.

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Salt Lake City, Utah

Ralph Barton
Los Alamitos, CA.
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Francis Billie
San Marino, CA.
(213) 444-0253

Marty Brecik
San Bernardino, CA.
(714) 885-8928

Diana Cantley
La Habra, CA.
(213) 691-3316

Emmet G. Daniels
Hawaiian Gardens, CA.
(213) 860-8673

Sheldon Dingle
Norco, CA.
(714) 734-7448

Marvin Gardner
Hawaiian Gardens, CA.
(213) 860-3615

James D. Gunderson
San Juan Capistrano, CA.
(714) 495-4303

Richard Mattice
La Puente, CA.
(213) 964-4219

George E. Norris
Bodfish, CA.
(714) 379-8269

Mickey Olsson
Glendale, AZ.
(602) 939-1003

Donald Rhodes
(714) 822-4805

Bernard Rohr
Phoenix, AZ.
(602) 242-2477

Don Tucker
Hacienda Hts, CA.
(213) 330-6120

Arland & Loretta Vaughn
Pueblo, Colorado

Tom Waller
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in the wild.

The International Species Inventory System (ISIS) was initiated by the AAZPA and AAZV in 1974 to collect, analyze and disseminate in a usable form, census and vital statistics data on wild species held in captivity. Such data are considered essential if the hazards of fortuitous losses of species and of loss of genetic variability are to be avoided in working with dispersed, small captive populations. The ISIS program provides a convenient and participant-oriented record system designed for manual and computer use. The reports are designed to provide useful information for local management as well as interesting biological information on the species.

Participants are provided annually with three reports. The participant Inventory Report is a complete and detailed listing by species of the inventory of the individual participant. The Acquisition/Release Report is a similarly arranged report itemizing all changes in the collection during the year. The ISIS

Species Distribution Report is a summary by species of all specimens recorded in ISIS and provides an overall picture of the status of the species in captivity. All participants holding a given species and the age and sex composition of their holdings are listed, followed by tables on age and sex structure, mortality, births, and other acquisition and release information. Similar summaries are provided at the level of genus, family, and order. The report for 1977 was 2,400 pages long and is provided in its entirety only in microfiche. Individual portions are available in hard copy.

Participants are also provided with a set of directories. The ISIS Institution Procedures describes the methods for recording and submitting data to ISIS. The ISIS World Geographic and Zoological Institution Directory provides a hierarchical listing of geopolitical divisions of the world, including a listing of organizations and individuals holding wild animals in captivity. The ISIS Avian Taxonomic Directories use a hierarchical taxonomic

coding system assigning unique members to each taxonomic grouping.

Data is submitted for each individual animal on forms provided by ISIS (figure 1). The data reported include species and participant identification, identification numbers of parents (if known), and source of the animal if not born in the collection. A form is also completed when the animal is removed from the collection, whatever the cause — whether sale, donation or death. If sent elsewhere, this is indicated so that a linkage is provided for tracing the animal throughout its life.

The census and vital statistics data system described has been operational for mammals for three years and was expanded to include the birds in 1976. As of the end of 1977 ISIS had information on 13,172 living birds, 1,577 live hatchings and 1,226 deaths. It is anticipated that information on approximately 30,000 birds will be included by the end of 1978.

We have recently added a pedigree/

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demography system for providing the analyses and outputs of interest for genetic and demographic management. This system includes studbook reports with the data organized by animal I.D. number, by parents, and by owner. Basic data reports providing such information as seasonality of births and deaths, birth sex ratios and life tables can be provided in a simple graphic form. Population history reports provide graphs showing the size of the captive population by year with sources of new acquisitions in terms of wild-born, captive-born F-1 and F-2 animals for each year. Genetic analysis reports will include calculated inbreeding coefficients for all individuals in the species and statistical analysis to search for effects of inbreeding on longevity and fecundity. There is also the possibility of a report with choices for matings based on calculations of projected inbreeding coefficients. Demographic reports will provide information on

whether a population is growing and at what rate and will allow projections of future population sizes and sex ratios and age structure. Further analyses of data can be developed as needs are identified. It will be possible with such a computer-based model to test the effects of proposed strategies for removal of animals from the breeding population.

All operating costs for the program are provided by the participants in the form of fees calculated at the rate of \$1.00 per living animal in the participant's reported inventory at the end of each calendar year or \$100.00 minimum if fewer than 100 specimens are included. The \$100.00 minimum fee reflects our experience with the costs of providing manuals, forms and reports.

If you are interested in further information or participation, please contact ISIS, Minnesota Zoological Garden, 12101 Johnny Cake Ridge Road, Apple Valley, MN 55124, U.S.A.

Figure 1

New Inventory Data		Scientific Name	Common Name	SPEC ID	HOUSE NAME	LOCATION	COLOR
TAXONOMIC CODE		INSTITUTION CODE		SPECIMEN ID		TRANSACTION DATE	
BIRTH DATA		DAM ID		SIRE ID		DAM INSTITUTION	
VITAL STATISTICS DATA		LOCATION		HT/DEPTH		AGE/BIRTH DATE	
TRANSACTION DATA		VENDOR/RECIPIENT CODE		W/R SPEC ID		PRICE	
DEATH DATA		CIRCUMSTANCE OF DEATH		CARCASS DISPOSITION		AUTOPSY	
SPECIAL DATA		STUDBOOK SPECIMEN		TATTOO NUMBER/HOUSE NAME		MARINE MAMMAL/REGULATORY BIRD PERMITS	
		POSTENTRY QUARANTINE		ENDANGERED SPECIES PERMIT		HAZARDOUS ANIMAL PERMIT	
		COLOR PHASE		TAG NUMBER		(24) SPECIAL	
						Institution	
						Date	
						Recorded By	
						189979	

AVIARY OWNERS SENTENCED FOR BIRD SMUGGLING

William Hampton and Marion Martinez of Basically Birds, Alpine, California, have been convicted of the offense of transportation and concealment of merchandise in violation of 18 USC 545 (smuggling). This conviction places Hampton and Martinez in violation of AFA's Code of Ethics. They have been relieved of AFA membership and advertising privileges in the Watchbird.



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

A Program of the American Association
of Zoological Parks and Aquariums

17 August 1978

Dr. George B. Rabb
Brookfield Zoo
Chicago Zoological Park
Brookfield, IL 60513

Dear Dr. Rabb:

Thank you for your request that ISIS materials be provided to the Peking Zoo. The suggested materials have been sent. We are pleased that you have provided us with the opportunity for expanded contact and hence will decline your generous offer to pay the material and shipping costs.

In addition, I have forwarded a copy of your request to Dr. U.S. Seal so that he may contact Mrs. Fu Chie personally.

Thank you again for your support of ISIS.

Sincerely,

Janice M. Olsen
Systems Manager, ISIS

JMO/kh

cc: Dr. U.S. Seal



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

A Program of the American Association
of Zoological Parks and Aquariums

17 August 1978

Mrs. Fu Chie
Peking Zoological Gardens
137 Si Shih Men Wai Street
Peking
People's Republic of China

Dear Mrs. Fu Chie:

At the request of Dr. George B. Rabb, Director, Brookfield Zoo, I have sent, under separate cover, all the materials necessary for participation in the International Species Inventory System (ISIS).

We are pleased to have the opportunity to provide you with these materials and to acquaint you with our system. Please do not hesitate to contact us if we can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Janice M. Olsen".

Janice M. Olsen
Systems Manager, ISIS

JMO/kh

cc: U.S. Seal, Director, ISIS
G.B. Rabb



Jan Olson

Brookfield Zoo

CHICAGO ZOOLOGICAL PARK
BROOKFIELD, ILLINOIS 60513
312-242-2630 312-485-0263

RECEIVED AUG 14 1978

George B. Rabb, Ph.D.
DIRECTOR

August 3, 1978

Ms. Linda Murtfeldt
ISIS Systems Manager
International Species Inventory System
Minnesota Zoological Garden
Wentworth Office Center
33 East Wentworth Avenue
West St. Paul, Minnesota 55118

Dear Ms. Murtfeldt:

Earlier this year, several U. S. zoo directors were in China visiting zoos. At the Peking Zoo, I was asked about the ISIS system, and I promised to send the requisite materials. Will you please box up and ship via air freight the complete system, including the mammalian taxonomic catalog, to Mrs. Fu Chie, Peking Zoological Gardens, Peking, China.

You may direct the bill for the materials and the shipping charges to me here at Brookfield.

Sincerely,

George B. Rabb

GBR/am



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

A Program of the American Association
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INTERNATIONAL SPECIES INVENTORY SYSTEM (ISIS)

MINNESOTA ZOOLOGICAL GARDEN

QUARTERLY PROGRESS REPORT

CONTRACT 14-16-008-2049

July - September 1978

1. OVERALL PROGRESS

Collection and updating of mammal and bird inventory data continues. During the months of July, August, and September, 4,246 mammal and 3,766 bird data forms were received and processed.

Second Quarter or Semi-Annual Inventory and Acquisition/Release Reports were produced for nine requesting participants.

The 1978 mid-year ISIS Species Distribution Report (copy enclosed for project officer) was produced for eight requesting participants. As of 30 June 1978, the ISIS inventory included 25,072 living mammals and 14,982 birds.

Development of the Physiological Norms System is nearly complete. The data forms (sample enclosed for project officer) have been printed and are ready for distribution. The procedures manual has been written and will be submitted for review and revision by the American Association of Zoo Veterinarians in November 1978.

Development of the Pedigree Analysis/Studbook/Demography System is nearly complete. The following reports (samples enclosed for project officer) can now be produced:

- Birth Sex Ratio and Seasonality
- Death Seasonality
- Population Size History
- Population Origin History
- Studbook Report

The studbook report format is still provisional and subject to revision.

Data collection on captive chimpanzee populations has been initiated at the request of the Interagency Primate Steering Committee.

Dr. U. S. Seal presented two papers at the Annual AAZPA Meetings held in Denver 17-21 September 1978. The papers were entitled "Noah's Ark - Sex and Survival", and "Reversible Hormonal Contraception in Zoo Animals".

Dr. U. S. Seal, ISIS Director, and Janice M. Olsen, ISIS Systems Manager, presented an annual report to the AAZPA Board of Directors on 17 September 1978, and a report to the AAZPA membership on 21 September 1978.

ISIS consultant Nate Flesness attended, on behalf of ISIS, the Conference on Conservation Research held in La Jolla, California, 6-9 September 1978.

2. CURRENT PROBLEMS IMPEDING PROGRESS

None.

3. WORK TO BE PERFORMED DURING NEXT QUARTER (October - December)

Processing of inventory data for mammals and birds will continue. 3rd Quarter Zoo Inventory and Acquisition/Release Reports will be produced for requesting participants.

Programming on the Physiological Norms System will be completed. The procedures manual and data forms will be distributed to all interested participants.

Dr. U. S. Seal will meet with the Board of Directors of the AAZV on 4 November 1978 to discuss the Physiological Norms System and to discuss possible financing alternatives.

Development of the Pedigree Analysis/Studbook/Demography System will be completed. The following additional reports should be available by the end of the quarter: Age - Specific Survivorship, Age - Specific Fertility, Population Projections, Inbreeding Coefficients.

Compilation of the reptilian and amphibian taxonomic directories will begin. "Vertebrates of the World, a Preliminary List", compiled by Gainesville Field Station, National Fish and Wildlife Laboratory, U.S. Fish and Wildlife Service, will be used as the basis of the directory.

Dr. U. S. Seal will attend the International Symposium on the Management and Breeding of the Tiger, in Leipzig, 11-12 October 1978. He will deliver papers entitled, "Baseline Hematology, Serum Chemistry and Hormone Data for Captive Tigers", and "Noah's Ark - Sex and Survival".



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9010

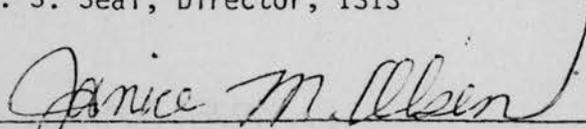
A Program of the American Association
of Zoological Parks and Aquariums

1978 ANNUAL REPORT
of the
INTERNATIONAL SPECIES INVENTORY SYSTEM (ISIS)
to the
OFFICERS AND DIRECTORS
of the
AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS
From
U. S. Seal
and
Janice M. Olsen
ISIS

Respectfully submitted



U. S. Seal, Director, ISIS



Janice M. Olsen, Systems Manager, ISIS

11 August 1978

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I. INTRODUCTION

This document comprises the annual report of ISIS to the officers and directors of the American Association of Zoological Parks and Aquariums. The report period is 22 August 1977 through 11 August 1978.

The report is divided into two major areas, Operations and Development, permitting separate review of the activities and budgets of these two programs. The report concentrates on daily activities and does not elaborate on the series of meetings, already well documented, that occurred between ISIS and the AAZPA during the past year. Recommendations are made in each area but are summarized in a final section.

II. OPERATIONS - INVENTORY SYSTEM

A. Activity Review

The majority of ISIS activities are concerned with the processing of participant data forms and the periodic distribution of reports. During the course of 1977, 17,246 mammal and 14,399 bird data forms were received and processed. 8,280 mammal and 7,018 bird data forms were processed in the first six months of 1978.

In February 1978, 111 institutions (Table 1) received 1977 annual reports and invoices for 1977 Participation Fees. 104 institutions had entered all or part of their mammal inventories, while 47 had entered avian data. 97 of the zoos receiving invoices had paid 1977 participation fees by 11 August 1978. Letters of inquiry have been sent to those institutions from whom payment has not yet been received. Six zoos (Table 2) discontinued ISIS participation since 1 September 1977. Termination was generally not in direct response to the rate increase. Several institutions (Table 3) have recently indicated an interest in ISIS participation. Beginning in March, 1978, new participants have been sent an invoice for \$100.00 to cover initial expenses. This payment will be credited toward the next year's participation fee.

The ISIS Species Distribution Report has been run annually for the years 1974 through 1977 and semiannually in 1977 and 1978. The following table summarizes the growth of the inventory.

<u>Period Ending</u>	<u>Mammals</u>	<u>Birds</u>
December 1974	14,345	0
December 1975	18,071	626
December 1976	21,975	4,663
June 1977	23,149	7,751
December 1977	24,434	13,172
June 1978	25,072	14,982

Since this report is distributed on microfiche, an attempt was made to determine participant access to the data. Of the forty nine participants responding to a questionnaire on microfiche reader accessibility, twenty one indicated ownership of a microfiche reader, while an additional twelve had access to one. Sixteen respondents had no microfiche reader but requested that ISIS provide them with information. ISIS has also made available hard copy of portions of the Species Distribution Report to those participants submitting requests, but only two or three institutions have availed themselves of this service to date.

II. OPERATIONS - INVENTORY SYSTEM (continued)

A. Activity Review cont.

Quarterly and/or semiannual Inventory and Acquisition/Release Reports are produced, upon request, for several institutions each quarter. Zoos frequently availing themselves of this service are:

Baltimore Zoo, Baltimore, Maryland
Copenhagen Zoologisk Have, Copenhagen, Denmark
Kings Island, Kings Mills, Ohio
Los Angeles Zoo, Los Angeles, California
New York Zoological Park, Bronx, New York
National Zoological Park, Washington, D.C.
National Zoological Park Conservation Center, Front Royal, Virginia
National Zoological Parks Office of Zoological Research, Wash., D.C.
Racine Zoological Park, Racine, Wisconsin
San Diego Wild Animal Park, San Diego, California
San Diego Zoological Gardens, San Diego, California
Washington Park Zoo, Portland, Oregon

In November, 1977, the ISIS Avian Taxonomy, Part II, was distributed to all active participants. The avian taxonomy is now complete, subject to revision or supplementation as needed. In May 1978, participants received a supplement to the ISIS World Geographic and Zoological Institution Directory including additional institutions and code assignments. Participants have been requested to submit further suggestions for institution code assignments as well as suggestions for supplements to both the mammalian and avian taxonomies.

Table 1

ISIS Participants - Invoiced for 1977 Participation Fee

1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	Participation Code
							0 - No data submitted 1 - Incomplete data or no recent update 2 - Update annually or on irregular basis 3 - Update regularly 4 - Entering only portion of Inventory
\$178.00	\$	\$	\$ 220.00	x	x	3	Abilene Zoological Gardens, Abilene, Texas
		70.00	100.00	x		1	African Lion Safari, Rockton, Ontario, Canada
92.00	92.00	10.00	100.00	x		1	Arizona - Sonora Desert Museum, Tuscon, Arizona
400.00	400.00	383.30	627.60*	x	x	1	Assiniboine Park Zoo, Winnipeg, Manitoba, Canada - DROPPED
170.00	130.00	36.00	100.00	x		1	Atlanta Zoological Park, Atlanta, Georgia
406.00	406.00	427.45	559.00	x	x	3	Baltimore Zoo, Baltimore, Maryland
83.00	109.00	121.60	137.00	x	x	2	Beardsley Zoological Gardens, Bridgeport, Connecticut
320.00	250.00	252.90	340.00	x	x	3	Birmingham Zoo, Birmingham, Alabama
	184.00	184.00	238.00			2	Boston Zoological Society, Dorchester, Massachusetts (3 zoos)
				x	x		Franklin Children's Zoo
				x			Franklin Park Zoo
				x			Walter D. Stone
271.00	259.00	321.50	564.00	x	x	3	Buffalo Zoological Gardens, Buffalo, New York
174.00	174.00	170.11	NO	x	x	3	Burnet Park Zoo, Syracuse, New York - \$230.00
		805.00	904.00	x		3	Busch Gardens, Tampa, Florida
	92.00	86.00	100.00	x		2	Caldwell Children's Zoo, Tyler, Texas
234.00	213.00	340.30	492.00	x	x	3	Calgary Zoo and Natural History Park, Calgary, Alberta, Canada

*Invoiced at the old rate of \$1.00/mammal and \$.35/bird.

Table 1 (cont.)

0 - No data submitted
 1 - Incomplete data or no recent update
 2 - Update annually or on irregular basis
 3 - Update regularly
 4 - Entering only portion of Inventory

1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	
\$	\$	\$	\$				
			100.00	x		2	Carlos Avery Wildlife Management Area, Forest Lake, Minnesota
		8.00	100.00	x		1	Cen-Tex Zoo, Waco, Texas
		454.00	458.00	x		3	Cheyenne Mt. Zoo, Colorado Springs, Colorado
800.00	800.00	528.00	999.00	x	x	3	Chicago Zoological Park, Brookfield, Illinois
300.00	351.00	328.00	571.00	x	x	3	Cincinnati, Zoological Society of, Cincinnati, Ohio
4.00	4.00	4.00	4.35*	x	x	1	Cleveland Aquarium, Cleveland, Ohio - DROPPED
	318.00	300.00	315.00	x		2	Cleveland Metroparks Zoological Park, Cleveland, Ohio
182.00	199.00	236.40	613.00	x	x	3	Columbia Zoological Park, Columbia, South Carolina (Riverbanks)
			158.00	x		3	Copenhagen Zoologisk Have, Copenhagen, Denmark
	282.00	282.00	282.00	x		2	Crandon Park Zoological Garden, Key Biscayne, Florida (Miami)
	491.00	477.00	1,425.00	x	x	2	Denver Zoological Gardens, Denver, Colorado
100.00		91.60	NO	x	x	1	Dickerson Park Zoo, Springfield, Missouri - \$102.00
	255.00	253.00	260.00	x		3	Duke University Primate Facility, Durham, North Carolina
	108.00	106.00	123.00	x		1	Duluth Zoo, Duluth, Minnesota
	32.00	32.00	NO	x		1	Ellen Trout Park Zoo, Lufkin, Texas - \$100.00
100.00	87.00	87.00	100.00	x		1	El Paso Zoological Park, El Paso, Texas
74.00	70.00	78.85	100.00	x	x	3	Erie Zoo, Erie, Pennsylvania

*Invoiced at the old rate of \$1.00/mammal and \$.35/bird.

Participation Code

Table 1 (cont.)

- 0 - No data submitted
 1 - Incomplete data or no recent update
 2 - Update annually or on irregular basis
 3 - Update regularly
 4 - Entering only portion of Inventory

1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	
\$106.00	\$140.00	\$ 167.75	\$ 257.00	x	x	3	Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
	155.00	235.80	580.00	x	x	3	Fort Worth Zoological Park, Fort Worth, Texas
	19.00	18.00	NO			0	Gilbert, Mr. & Mrs. Frank H., Phoenix, Arizona - \$100.00
459.00	432.00	535.65	812.00	x	x	3	Gladys Porter Zoo, Brownsville, Texas
107.00	79.00	83.85	109.00	x	x	3	Glen Oak Zoo, Peoria, Illinois
	203.00	221.00	457.00	x	x	3	The Greater Baton Rouge Zoo, Baton Rouge, Louisiana
310.00	321.00	347.20	464.00	x	x	3	Henry Doorly Zoo, Omaha, Nebraska
	273.00	26.00	100.00	x		1	Henry Vilas Park Zoo, Madison, Wisconsin
281.00	281.00	161.00	153.00	x		1	Highland Park Zoo, Pittsburgh, Pennsylvania
	415.00	415.00	NO	x		1	Hogle Zoological Garden, Salt Lake City, Utah - \$415.00
	540.00	517.00	NO	x		3	Houston Zoological Gardens, Houston, Texas - \$494.00
240.00	155.00	186.90	261.00	x	x	2	Jackson Zoological Park, Jackson, Mississippi
	213.00	222.00	491.00	x	x	3	Jacksonville Zoological Park and Society, Jacksonville, Florida
220.00	201.00	203.00	181.00	x		3	Jardin Zoologique de Quebec, Quebec, Canada
38.00	41.00	85.40	169.00	x	x	1	Kemper Zoological Park, Hattiesburg, Mississippi
317.00	362.00	329.90	396.00	x	x	1	Kansas City Zoological Gardens, Kansas City, Missouri
		66.00	100.00	x		2	Kings Dominion (Lion Country Safari), Doswell, Virginia
			249.00	x	x	3	Kings Island, Kings Mills, Ohio

Table 1 (cont.)

Participation Code

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	1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	
\$	\$198.00	\$ 198.00	\$ 220.00	x	2		Knoxville Zoological Park, Knoxville, Tennessee	
	40.00	40.00	NO	0			Las Vegas Valley Zoo, Las Vegas, Nevada - \$100.00	
		12.00	NO	x	1		Lee Richardson Zoo, Garden City, Kansas - \$100.00	
	106.00	110.00	130.00	x	2		Lincoln Municipal Zoo, Lincoln, Nebraska	
	770.00	770.00	907.00	x	3		Lincoln Park Zoo, Chicago, Illinois	
			188.00	x	4		London, Zoological Society of, London, England	
-L	480.00	527.00	635.00	NO	x	3	Los Angeles Zoo, Los Angeles, California - \$761.00	
	187.00	216.00	251.00	x	2		Louisville Zoological Garden, Louisville, Kentucky	
	165.00	226.90	405.00	x	x	3	Mesker Park Zoo, Evansville, Indiana	
	606.00	861.00	1,103.25	1,737.00	x	x	3	Metro Toronto Zoo, West Hill, Ontario, Canada
	25.00	17.00	17.00	100.00	x	x	3	Miller Park Zoo, Bloomington, Illinois
	456.00	581.95	1,058.00	x	x	3	Milwaukee County Zoo, Milwaukee, Wisconsin	
	8.00	8.00	10.35	130.00	x	x	3	Minnesota Zoological Garden, Apple Valley, Minnesota
	96.00	97.00	107.25	136.00	x	x	3	Montgomery Zoo, Montgomery, Alabama
	480.00	522.00	507.50	1,426.00	x	x	3	National Zoological Park, Washington, D.C.
		66.00	114.10	236.00	x	x	3	National Zoological Park Conservation Center, Front Royal, Virginia
		149.00	157.00	x	x	3	National Zoological Park Office of Zoological Research, Wash., D.C.	
		36.00	38.85	NO	x	x	3	Natural Science Center, Greensboro, North Carolina - \$100.00

Table 1 (cont.)

Participation Code

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	1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	
	\$	\$	\$	\$				
				58.00*	x		1	Nature Center, Asheville, North Carolina - DROPPED
			14.00	100.00			0	New England Aquarium, Boston, Massachusetts
	749.00	789.00	299.05	1,472.00	x	x	3	New York Zoological Society, Bronx, New York
		21.00	30.00	74.00	x	x	3	N. Y. Society St. Catherines Survival Center, St. Cath. Isl., GA.
		56.00	56.00	100.00	x		1	North Carolina Zoological Park, Asheboro, North Carolina
	568.00	546.00	648.65	727.00	x	x	1	Oklahoma City Zoo, Oklahoma City, Oklahoma
∞	374.00	355.00	343.45	1,041.00	x	x	3	Philadelphia Zoological Garden, Philadelphia, Pennsylvania
	163.00	168.00	180.00	178.00	x		2	Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
				130.00	x		3	Racine Zoological Park, Racine, Wisconsin
		63.00	75.30	100.00	x	x	3	Ralph Mitchell Zoo, Independence, Kansas (Riverside)
	136.00	120.00	168.50	202.55*	x	x	1	Randolph Park Zoo, Tucson, Arizona - DROPPED
	33.00	160.00	192.00	201.00	x		1	Rio Grande Zoo, Albuquerque, New Mexico
	182.00	182.00	182.00	182.00			3	Roeding Park Zoo, Fresno, California
		81.00	81.00	100.00	x		3	Roger Williams Zoo, Providence, Rhode Island
	75.00	75.00	74.00	NO	x		1	Roosevelt Park Zoo, Minot, North Dakota - \$100.00
	531.00	430.00	470.50	632.00	x	x	3	St. Louis Zoological Park, St. Louis, Missouri
	143.00	145.00	152.40	168.00	x	x	1	St. Paul's Como Zoo, St. Paul, Minnesota
	.	225.00		188.00	x		2	Sacramento Zoo, Sacramento, California

*Invoiced at old rate of \$1.00/mammal and \$.35/bird.

Tabel 1 (cont.)

Participation Code

- 0 - No data submitted
 1 - Incomplete data or no recent update
 2 - Update annually or on irregular basis
 3 - Update regularly
 4 - Entering only portion of Inventory

1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	
\$ 47.00	\$ 61.00	\$ 128.05	\$ 300.00	x	x	3	The Salisbury Zoo, Salisbury, Maryland
740.00	728.00	728.00	236.00	x	x	3	San Antonio Zoological Gardens, San Antonio, Texas
643.00	773.00	951.00	1,069.00	x		3	San Diego Wild Animal Park, San Diego, California
900.00	795.00	840.00	2,477.00	x	x	3	San Diego Zoological Gardens, San Diego, California
	523.00	317.00	511.00	x	x	3	San Francisco Zoo, San Francisco, California
103.00	110.00	108.50	128.00	x	x	3	Santa Barbara Zoological Gardens, Santa Barbara, California
48.00	40.00	60.25	120.00	x	x	3	Santa Fe Community College Teaching Zoo, Gainesville, Florida
			9.00*	x		3	Seafloor Aquarium, Nassau, Bahamas
		11.00	NO			0	Seattle Aquarium, Seattle, Washington - \$100.00
	120.00	94.10	201.00	x	x	3	Sedgwick County Zoo, Wichita, Kansas
	139.00	216.45	335.00	x	x	3	Seneca Park Zoo, Rochester, New York
3.00	3.00	3.00	100.00	x		2	John G. Shedd Aquarium, Chicago, Illinois
	221.00	83.05	104.00	x	x	2	South Bend Zoo, South Bend, Indiana (Potawatomi)
		723.00	750.00	x		3	Stichting Koninklijke Rotterdamse Diergaarde, Rotterdam, Netherland
		48.00	NO	x		1	Terry Lou Zoo, Scotch Plains, New Jersey - \$100.00
127.00	116.00	154.50	268.00	x	x	3	Topeka Zoological Park, Topeka, Kansas
193.00	156.00	191.30	330.00	x	x	3	Tulsa Zoo, Tulsa, Oklahoma
194.00	132.00	155.80	360.00	x	x	3	Turtle Back Zoo, West Orange, New Jersey

*Invoiced at the old rate of \$1.00/mammal and \$.35/bird.

Table 1 (cont.)

Participation Code

- 0 - No data submitted
 1 - Incomplete data or no recent update
 2 - Update annually or on irregular basis
 3 - Update regularly
 4 - Entering only portion of Inventory

1974 Fee Paid	1975 Fee Paid	1976 Fee Paid	1977 Fee Paid	Mammals	Birds	Participation Code	
\$	\$117.00	\$ 118.00	\$ 116.00	x		2	Utica Zoo, Utica, New York
	18.00	18.00	NO			0	Vancouver Public Aquarium, Vancouver, British Columbia - \$100.00
		92.05	314.00	x	x	1	Walt Disney World, Lake Buena Vista, Florida
221.00	251.00	266.30	322.00	x	x	3	Washington Park Zoo, Portland, Oregon
12.00	16.00	14.00	100.00	x		2	Wild Canid Survival and Research Center, St. Louis, Missouri
	387.00	388.00	422.00	x		3	Woodland Park Zoological Gardens, Seattle, Washington

Table 2

Zoos Discontinuing Participation

Assiniboine Park Zoo, Winnipeg, Manitoba, Canada

March 28, 1978 I have just received your invoice #604 for U.S. \$1,093.00 for our participation in ISIS in 1977. I was surprised to discover the charge for birds had been increased, without anyone's knowledge here, to \$1.00 from .35.... Changes in the fee structure in mid-stream are unacceptable and I hope you are in a position to provide an explanation... I have been reviewing for some time the value of our continued involvement in the ISIS program and have decided that we must withdraw, temporarily perhaps, our participation.

April 17, 1978 It was somewhat unfortunate that my complaint regarding the increase in bird rates should have coincided with the news that we intended to withdraw from ISIS. In fact, several factors led up to this decision...Due to political reasons beyond our control, we are currently experiencing extreme financial restraints, with an operating budget still likely to be further reduced probably considerably below that of 1977...Consequently, for this, and other reasons, we no longer have an ISIS record keeper, and cannot therefore continue.
Clive G. Roots, Zoo Director

Cleveland Aquarium, Cleveland, Ohio

April 4, 1978 The Cleveland Aquarium has received the invoice for participating in the ISIS system ending December 31, 1977. There has been put into effect a minimum charge of \$100.... Taking into consideration the fact that The Cleveland Aquarium has only five animals on record with ISIS, we simply do not have the funds appropriated.... In closing, The Cleveland Aquarium will not at present be able to actively participate in the ISIS program. However, we will be happy to continue contributing information regarding our specimens on a non-active basis. George Buehner, Aquarist

Cohanzick Zoo, Bridgeton, New Jersey

September 13, 1977 ...this past year we came to the conclusion that the reports issued by the ISIS are really not beneficial to our very small operation. We have no use for the microfiche because we do not have the proper equipment to use it and do not intend to invest in it. The reports simply do not serve a valid purpose for us. Also, we are unable to hire our part time representative any longer. Consequently we wish to withdraw from the program. Please realize that I understand the benefits a program such as yours offers to the larger zoos and I have nothing against the program itself. It just does not work for us....
Henry R. Ricci, Curator

Table 2 (continued)

Nature Center, Asheville, North Carolina

9 March 1978 The Western North Carolina Nature Center is experiencing quite a budget crunch this year. I, therefore, regret to inform you that we will not be appropriated the funds to participate in ISIS this year.
Paul C. Leslie, Senior Naturalist

Randolph Park Zoo, Tucson, Arizona

10 March 1978 We regret to have to inform you that Randolph Park Zoo is forced to withdraw from ISIS, effective immediately. The city administration of Tucson has embarked on an financial austerity program which also affects the Zoo. If and when we will be able to rejoin ISIS must remain open at this time. With our best wishes for success of your program, we remain...
Ivo Poglayen, Zoo Administrator

North American Wildlife Park Foundation, Inc., Battle Ground, Indiana

6 March 1978 ...Please understand that the reason we are withdrawing is simply that we feel that the time and cost involved is not commensurate with the return we receive. I realise that as a first step the system is great, and I have supported it in the past. However, from a scientific point of view there is just not enough information available in my opinion.
Erich Klinghammer, President

Table 3

NEW ISIS PARTICIPANTS

Avian Behaviour Laboratory (Shapiro), Winnipeg, Manitoba, Canada

Breedmore Inc. (Paul Botsch), Shohola, Penn.

Crown Animal Sales, San Lorenzo, California

*Detroit Zoological Park, Royal Oak, Michigan

*Jersey Wildlife Preservation Trust, Jersey, British Isles

*Little Rock Zoo, Little Rock, Arkansas

Marineland of Florida, St. Augustine, Florida

University of Texas System Cancer Center (Keeling), Bastrop, Texas

Waters Ranches (Dan Waters), Mt. Home, Texas

*Data Submitted

II. OPERATIONS - INVENTORY SYSTEM (continued)

B. Operations Budget

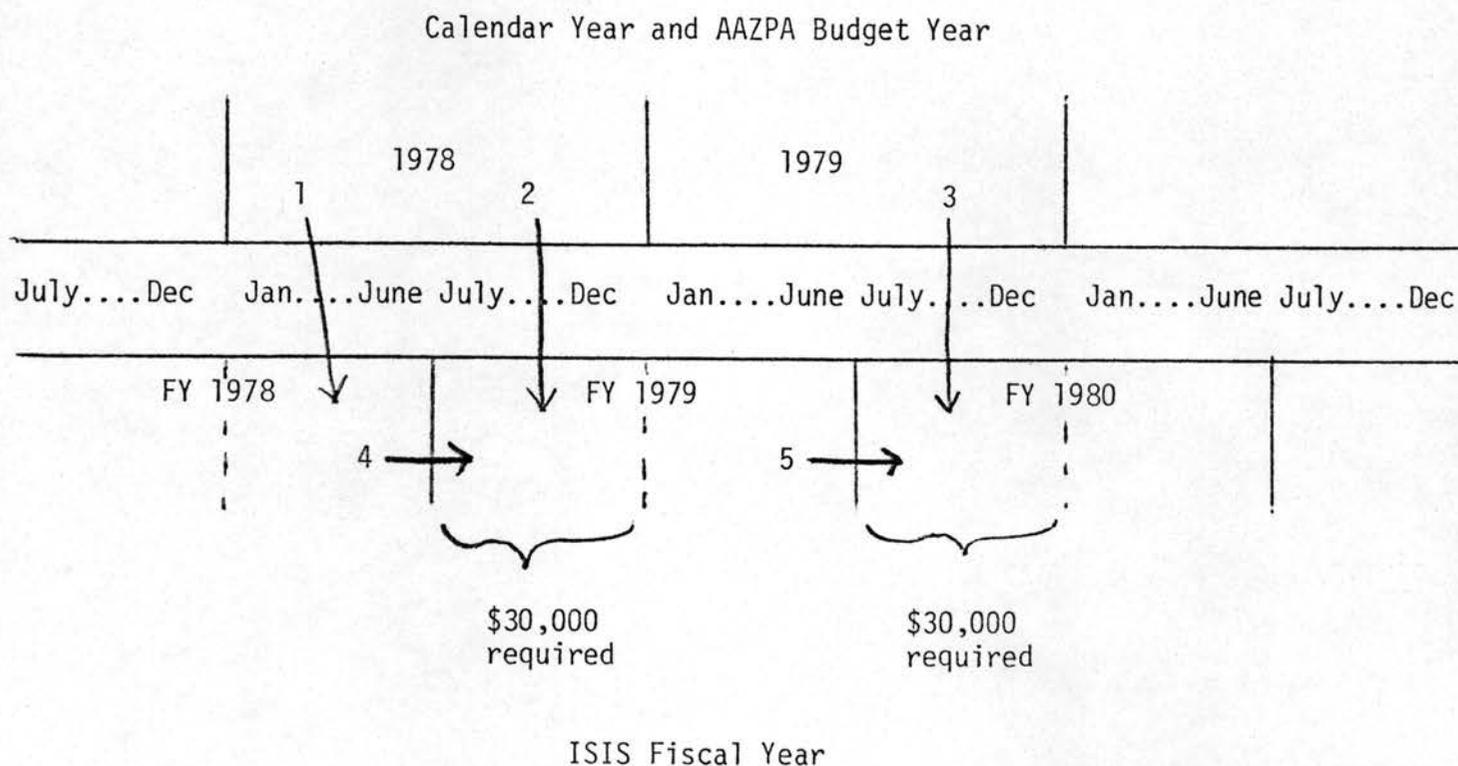
The activities involved in the daily operation of this system require the majority of staff time and hence both full-time staff positions, as well as associated data processing, printing, postage, supplies, equipment etc. are charged to the operations budget. It is the objective to cover operating costs from income derived from participation fees, special reports and directory sales. In Fiscal Year 1977, 60% of the operating budget was provided by participation fees, while in Fiscal Year 1978, ending 30 June 1978, this percentage increased to 75%. Directories, reports and miscellaneous income provided approximately 5%, while the remaining 20% of expenses were covered by an AAZPA donation of \$15,000, approximately \$5,500 of which was transferred to Fiscal Year 1979. Operations Budgets for Fiscal Years 1978, 1979 and 1980 are presented in tables 4 - 9.

ISIS operates on a fiscal year which does not correspond to the AAZPA fiscal year or the calendar year. ISIS budgets cover 1 July through 30 June. In addition, ISIS bills participants for services in the previous calendar year. Briefly stated, ISIS participation income is received approximately eight months into the operating year and after eight months of deficit spending. The relationship between the budget and calendar years is illustrated in Figure 1.

ISIS requires a minimum of \$30,000 to cover operating expenses incurred during the first six months of an ISIS Fiscal Year (July - December). Recognizing this need for operating capital, the AAZPA Board of Directors voted on 12 March 1978 to make a \$20,000 loan available to ISIS. These funds will be advanced in five monthly installments of \$4,000 each, beginning in August 1978. Dr. U. S. Seal and Dr. George Rabb offered to assist the Association in an attempt to gain grants for ISIS operations from various international sources. It would be the intention to seek grant funds to pay for this loan and in addition to generate an additional \$10,000. Dr. U. S. Seal has arranged a contract for \$5,750 with the Interagency Primate Steering Committee to develop an information base on chimpanzees in the United States and will attempt to generate the remainder of the \$10,000. In addition to these funds, approximately, \$5,500 in funds remaining in FY 1978 were transferred to FY 1979, beginning on 1 July 1978.

Income and expense projections for ISIS FY 1979 (1 July 1978 - 30 June 1979) indicate a remainder of approximately \$13,000 will be available for transfer to FY 1980 as of 1 July 1979. Thus, ISIS will lack approximately \$17,000 of the \$30,000 minimum required for six months of operations from 1 July through 31 December 1979. ISIS will not be in a position to repay the \$20,000 loan, but will require an additional grant of \$15,000 from the AAZPA for operating capital through December 1979 and in order to project a balanced budget for FY 1980.

Figure 1



1. \$15,000 grant from AAZPA to ISIS to balance ISIS FY 1978 Budget.
2. \$20,000 loan from AAZPA to provide ISIS with operating capital and to project a balanced budget for FY 1979.
3. \$15,000 grant requested from the AAZPA to provide ISIS with operating capital through December 1979, and to project a balanced budget for FY 1980.
4. Approximately \$5,500 in remaining FY 1978 Funds transferred to FY 1979. (\$30,000 required for 6 months operation.)
5. Projected \$13,000 in remaining FY 1979 Funds to be transferred to FY 1980. (\$30,000 required for 6 months operation.)

Table 4

ISIS - Operations
Income FY 1978
(1 July 1977 - 30 June 1978)

<u>Source</u>	<u>Original Projected Income (Aug.77)</u>	<u>Revised Projected Income (Jan.78)</u>	<u>Actual Fiscal Year Income</u>	<u>Variance From Revised Projections</u>
1976 Zoo Participation Fees Paid in Fiscal Year 1978 (late payment)	\$ 3,000.00	\$ 3,044.11	\$ 3,222.11	\$ 178.00
1977 Zoo Participation Fees (Original Projection at \$1.00/Mammal, \$.35/Bird) (Revised Projection at \$1.00 per Specimen)	26,000.00	39,152.50	36,075.50	3,077.00-
1978 Zoo Participation Fees (Prepaid)	0.00	0.00	96.00	96.00
Demand Reports	500.00	575.00	455.00	120.00-
Directories	500.00	1,500.00	1,270.00	230.00-
Miscellaneous Contributions	100.00	200.00	305.00	105.00
AAZPA	<u>0.00</u>	<u>15,000.00</u>	<u>15,000.00</u>	<u>0.00</u>
TOTAL	\$30,100.00	\$59,471.61	<u>\$56,423.61</u>	\$3,048.00-

Table 5

ISIS - Operations
Expenses FY 1978
(1 July 1977 - 30 June 1978)

<u>Budget Item</u>	<u>Projected Budget</u>	<u>Actual* Expenditures</u>	<u>Variance</u>
Salaries + Fringe Benefits	\$29,650.00	\$29,981.90	\$ 331.90-
Data Processing	14,000.00	13,945.51	54.49
Printing	3,000.00	2,295.28	704.72
Postage	2,450.00	1,558.56	891.44
Addressograph	50.00	7.50	42.50
Supplies	600.00	570.56	29.44
Repairs	100.00	0.00	100.00
Miscellaneous	100.00	20.00	80.00
Travel	2,600.00	1,181.69	1,418.31
Equipment Purchase	400.00	193.00	207.00
State Indirect Cost Billing	1,200.00	564.00	636.00
Legal Fees	<u>0.00</u>	<u>537.80</u>	<u>537.80-</u>
TOTAL	\$54,150.00	<u>\$50,855.80</u>	\$3,294.20
Income FY 1978	\$56,423.61		
*Expenses FY 1978	<u>50,855.80</u>		
*Remainder Transferred to FY 1979	\$ 5,567.81		

*These figures are tentative, pending the closing of FY 1978 books in September 1978.

Table 6

ISIS - Operations
Income FY 1979
(1 July 1978 - 30 June 1979)

<u>Source</u>	<u>Projected Income</u>	<u>Income Year-to-Date</u>
Transferred From FY78	\$ 5,567.81 ¹	\$ 5,567.81 ¹
1977 Zoo Participation Fees Paid in Fiscal Year 1979 (\$3,077.00 Unpaid)	1,685.00	100.00
1978 Zoo Participation Fees (Payable March 1979)	41,000.00	
Demand Reports	1,500.00	50.00
Directories	1,000.00	
Miscellaneous Contributions	500.00	10.00
Interagency Primate Steering Committee Contract	5,750.00	
Pedigree/Demography/Studbook System	0.00 ²	
AAZPA Loan	<u>20,000.00</u>	<u>4,000.00</u>
TOTAL	\$77,002.81	\$ 9,727.81

¹These figures are tentative, pending the closing of FY 1978 books in September 1978.

²No sound basis for projections at this time.

Table 7

ISIS - Operations
 Expenses FY 1979
 (1 July 1978- 30 June 1979)

<u>Budget Item</u>	<u>Projected Budget</u>
Salaries + Fringe Benefits	\$32,500.00
Data Processing	18,000.00
Printing	4,000.00
Postage	2,500.00
Addressograph	50.00
Supplies	750.00
Repairs	200.00
Miscellaneous	100.00
Travel	4,000.00
Equipment Purchase	400.00
State Indirect Cost Billing	<u>1,000.00</u>
TOTAL	\$63,500.00

Projected Income FY 1979	\$77,002.81
Projected Expenses FY 1979	<u>63,500.00</u>
Remainder to be Transferred to FY 1980	\$13,502.81

Table 8
 ISIS - Operations
 Income FY 1980
 (1 July 1979 - 30 June 1980)

<u>Source</u>	<u>Projected Income</u>
Remaining Funds to be Transferred From FY 1979	~ \$13,000.00
1978 Zoo Participation Fees (Late Payment)	0.00
1979 Zoo Participation Fees (Payable March 1980)	47,000.00 ¹
Demand Reports	1,500.00
Directories	1,000.00
Miscellaneous Contributions	500.00
Pedigree/Demography/Studbook System	0.00 ²
	<hr style="width: 100px; margin-left: auto; margin-right: 0;"/> \$63,000.00

¹ Includes estimated income of \$5,000 from reptiles, amphibians and fishes data.

² No sound basis for projections at this time.

Table 9

ISIS - Operations
 Expenses FY 1980
 (1 July 1979 - 30 June 1980)

<u>Budget Item</u>	<u>Projected Budget</u>
Salaries + Fringe Benefits	\$35,000.00
Data Processing	19,000.00
Printing	4,000.00
Postage	3,000.00
Addressograph	50.00
Supplies	900.00
Repairs	200.00
Miscellaneous	100.00
Travel	4,000.00
Equipment Purchase	400.00
Equipment Rental	350.00
Consultants	2,000.00
State Indirect Cost Billing	<u>1,000.00</u>
	\$70,000.00

III. DEVELOPMENT

A. Reptiles, Amphibians, Fishes - Taxonomy and Inventory - Activity Review

Funding from the Office of Endangered Species, U.S.D.I., is available for compilation and printing of taxonomic directories for the reptiles, amphibians and fishes. No significant development has occurred during the past year. Wayne King has offered to assist ISIS in obtaining taxonomic lists, which he hopes to make available in August of 1978. Upon receipt of these lists, ISIS will assign code numbers, common names and locations. Half-time clerical support for six months has been hired to assist in preparation of the directories. The directories should be distributed in the Spring of 1979. A conservative estimate of income from these additions to the taxonomy is approximately \$5,000 in Fiscal Year 1980.

B. Pedigree/Demography/Studbook System - Activity Review

Development of this system has been the major effort of the past year. The system is designed to use the ISIS data base for report production, but the data routinely entered by participants can be supplemented by studbook data or a zoo's own historical records. Data from the International Tiger Studbook (Seiffert) has been entered into the ISIS files to provide an ample base for testing. Data from the Przewalski Horse Studbook (Volf) and the Golden Lion Marmoset Studbook (Kleiman) have been coded for keypunching and will be entered into the computer files within the next few months. A variety of sample reports on both studbook and non-studbook species will be presented to the AAZPA Board of Directors on 17 September 1978 by U.S. Seal and J.M. Olsen. As many as possible of the following reports will be presented:

- Studbook Reports
- Birth Seasonality
- Death Seasonality
- Birth Sex Ratio
- Age - Specific Survivorship
- Age - Specific Fertility
- Population Size History
- Population Origin History
- Population Projections
- Inbreeding Coefficients.

This system should be largely completed and operational by mid-September 1978. Sufficient funding from the USDI is available to complete development and to provide sample reports.

A fee schedule and a priority schedule for entry of various studbooks must be developed. It is hoped that income from this system can be used to increasingly supplement the income from the participation fees of the inventory system, and to reduce the funding requested from the AAZPA.

III. DEVELOPMENT (continued)

C. Physiological Reference Data - Activity Review

The Physiological Reference Data program involves the collection and tabulation of baseline laboratory data on animals held in captivity. The data will be used for calculation of normal values for each of the respective species. Test data has been entered into the computer files, data forms have been printed and are ready for distribution, the procedures manual is in preparation and programming on the various report formats is underway. The development costs of this system far exceeded estimates, so, after considerable negotiation, ISD (Information Systems Division, State of Minnesota) credited a cost override of \$12,529.38 to the ISIS account. Without this concession from ISD, development of this project would have ceased for the present time.

Funding to complete system development is available, but a fee structure to cover the operating costs of the system must be developed in conjunction with the participating zoos and the American Association of Zoo Veterinarians. ISIS will request a discussion of funding possibilities at the November 1978 American Association of Zoo Veterinarians Annual Meeting.

D. Development Budget

Development budgets for Fiscal Years 1978 and 1979 are presented in tables 10 - 13. As discussed in the activity narratives, funding to complete all current development programs is available.

Upon completion, the additional taxonomies and Pedigree/Demography/ Studbook Programs will become part of the operating program of ISIS and hence all expenses and income will be reflected in the operations budgets. The Physiological Reference Data program will be operated under a separate, as yet undetermined, budget.

No funds for development are being sought at this time, either from the AAZPA or other sources.

Table 10

ISIS - Development
Income FY 1978
(1 July 1977 - 30 June 1978)

<u>Source</u>	<u>Original Projected Income (Aug.77)</u>	<u>Revised Projected Income (Jan.78)</u>	<u>Actual Fiscal Year Income</u>	<u>Variance From Revised Projections</u>
Transferred From FY77	\$11,600.00	\$11,600.00	\$11,785.46	\$ 185.46
FY77 Computer Services Revolving Fund - Excess Profit Refund	0.00	0.00	1,770.53	1,770.53
Credit From ISD Phys. Norms Cost Override	0.00	0.00	12,529.38	12,529.38
USDI	<u>10,000.00</u>	<u>20,000.00</u>	<u>20,000.00</u>	<u>0.00</u>
TOTAL	\$21,600.00	\$31,600.00	<u>\$46,085.37</u>	<u>\$14,435.37</u>

Table 11

ISIS - Development
Expenses FY 1978
(1 July 1977 - 30 June 1978)

<u>Budget Item</u>	<u>Projected Budget</u>	<u>Actual Expenditures</u>	<u>Variance</u>
Data Processing			
Phys. Norms - ISD	\$ 8,000.00	\$ 8,134.10	\$ 134.10-
ISD Cost Override	0.00	12,529.38	12,529.38-
U of M	1,000.00	0.00	1,000.00
Studbook - ISD	4,000.00	4,180.88	180.88-
U of M	5,000.00	919.07	4,080.93
Printing - Avian Taxonomy	2,500.00	2,728.04	288.04-
- Herp Taxonomy	2,500.00	0.00	2,500.00
Consultants			
Phys. Norms - Scobie	0.00	300.00	300.00-
Studbook - Flesness	2,000.00	0.00	2,000.00
Linda Murtfeldt	240.50	192.00	48.50
Gale Ikola	759.50	1,059.50	300.00-
Computer Terminal Rental	0.00	28.34	28.34-
Supplies	<u>0.00</u>	<u>117.00</u>	<u>117.00-</u>
TOTAL	\$26,000.00	\$30,188.31	\$4,188.31-

Table 12

ISIS - Development
Income FY 1979
(1 July 1978 - 30 June 1979)

<u>Source</u>	<u>Projected Income</u>	<u>Income Year-to-Date</u>
Transferred From FY 1978	\$15,897.06	\$15,897.06
USDI	<u>10,000.00</u>	<u>0.00</u>
TOTAL	\$25,897.06	\$15,897.06

Table 13

ISIS - Development
Expenses FY 1979
(1 July 1978 - 30 June 1979)

<u>Budget Item</u>	<u>Projected Budget</u>
Data Processing	
Phys. Norms - ISD	\$ 3,000.00
U of M	1,391.96
Studbook - U of M	5,000.00
Printing	
Reptilian Taxonomy	4,000.00
Amphibian Taxonomy	4,000.00
Fishes Taxonomy	4,000.00
Consultants	
Phys. Norms - Scobie	700.00
Studbook - Flesness	500.00
Salaries	
6 month 1/2 time clerk-typist	2,305.10
Computer Terminal Rental	<u>1,000.00</u>
TOTAL	\$25,897.06

IV. SUMMARY AND RECOMMENDATIONS

A. Summary

It is the objective of ISIS to generate, during the course of calendar year 1979, additional operating income through:

1. increased participation in the inventory system through the addition of reptiles, amphibians and fishes,
2. increased participation by additional zoos in the United States, Canada, and abroad, and
3. participation in and utilization of the Pedigree/Demography/Studbook System.

We feel that it should be the goal of ISIS and the AAZPA to generate sufficient participation to reduce the operating deficit to zero by the end of calendar year 1979.

B. Recommendations

1. ISIS recommends that the American Association of Zoological Parks and Aquariums Board of Directors continue to seek grant funds from various international sources to reimburse the AAZPA for the \$20,000 loan to ISIS. However, in the event that the AAZPA Board of Directors is unable to obtain such funds, ISIS recommends that the status of the loan be changed to a grant. An alternative to this would be for the AAZPA to delay the repayment of the loan by ISIS for one additional year and to continue to seek grant funds during this time. (Note that this liability is secured by assets in ISIS represented by Participation Fees coming due at the end of a participation year and collectable in March of the following year.)
2. ISIS recommends that the AAZPA Board of Directors provide a grant of up to \$15,000 to ISIS on 1 July 1979, so that ISIS will have sufficient operating capital for July through December 1979, and will be able to project a balanced budget through 30 June 1980.
3. ISIS recommends that the AAZPA Board of Directors request ISIS representatives to attend the mid-year AAZPA Board meeting, bringing a detailed presentation of the completed Pedigree/Demography/Studbook System and a detailed cost analysis of this system. The Board would then be in a position both to evaluate the content of the various reports and to make recommendations on possible income from this system.

IV. SUMMARY AND RECOMMENDATIONS (continued)

B. Recommendations (continued)

4. ISIS recommends that the AAZPA President appoint an AAZPA Special Committee along the lines suggested at the 14 - 15 November ISIS Site Visit. This committee would be charged with the responsibility of regularly assessing participant requirements and of making suggestions to the ISIS staff. The character of the list suggested in November: Judith Block, Dave Zucconi, Marvin Jones, Paul Linger, Allegra Hamer, Alan Shoemaker, David Banks, R. Mitchell Bush, D.V.M., and Don Wilkie, indicates the emphasis on a "working participant" committee.
5. ISIS recommends that the AAZPA Board of Directors authorize distribution of this report as a general report to ISIS Participants and the AAZPA membership.

AAZPA ISIS PROGRAM

ANNUAL REPORT

22 August, 1977

To:

OFFICERS AND DIRECTORS

of the

AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

From:

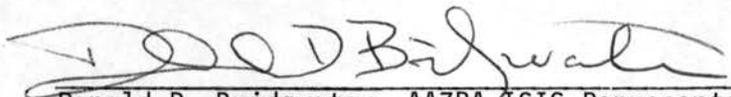
DONALD D. BRIDGWATER
AAZPA ISIS REPRESENTATIVE
and

JANICE M. OLSEN
SYSTEMS MANAGER, ISIS
MINNESOTA ZOOLOGICAL GARDEN
12101 JOHNNY CAKE RIDGE ROAD
APPLE VALLEY, MINNESOTA 55124

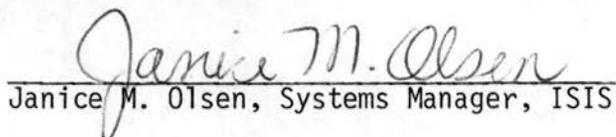
HEREIN IS PRESENTED A SUMMARY OF ACTIVITIES,
SUPPORTING DATA AND RECOMMENDATIONS FOR ACTION

WITH RESPECT TO THE AAZPA-ISIS PROGRAM

Respectfully submitted:



Donald D. Bridgwater, AAZPA-ISIS Representative



Janice M. Olsen, Systems Manager, ISIS

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I. INTRODUCTION

This document comprises the annual AAZPA-ISIS program report to the officers and directors of the American Association of Zoological Parks and Aquariums. The period covered is from 3 September 1976 to 22 August 1977.

II. CURRENT ORGANIZATION

A. Structure

Following the 1976 AAZPA annual meeting, the AAZPA-ISIS Committee and its substructure was dissolved by the AAZPA Board. Chairman Donald B. Bridgwater was appointed AAZPA-ISIS Representative and placed as a nonvoting representative on the new Wildlife Conservation and Management Committee. There were no communications issued relative to this action or as to how ISIS was to relate to the WCMC. A series of phone calls and correspondence between President Hubbell, Executive Director Robert Wagner, WCMC Chairman Dennis Meritt and Donald Bridgwater charted an interim course of action as follows:

1. The ISIS letterhead would include the words "A program of the American Association of Zoological Parks and Aquariums."
2. Donald Bridgwater would periodically (depending on volume) send copies of pertinent correspondence to Dennis Meritt for his information.
3. All reports, papers or related materials which discuss policy or publicly represent AAZPA-ISIS would be sent to Dennis Meritt for review and forwarded to appropriate parties.
4. For purposes of identification, Donald Bridgwater would sign all correspondence as "AAZPA-ISIS Representative".
5. Queries or concerns regarding ISIS by the Conservation Committee or members of the Board would be directed to Donald Bridgwater immediately for solution.

Subsequently, a mid-year report was given to the AAZPA Board in Washington, D.C. At that time, an additional \$4,817.00 was provided to accompany \$6,000.00 provided in January for development of Phase I of the Studbook and Pedigree Analysis Subsystem.

Much discussion on the operation, capabilities, and AAZPA-ISIS relationship took place. Most significant was the need to re-establish an effective and operational AAZPA-ISIS structure. President Hubbell appointed and charged Bob Wagner, in concert with Dennis Meritt, Don Farst and Don Bridgwater, to develop recommendations for consideration in September, 1977. To date, no action has been initiated.

Other recommendations included:

1. Encouragement of member institutions to submit data and pay fees.
2. Assist in securing new development funds.
3. Nominate out-going Systems Manager, Linda Murtfeldt, for an appropriate AAZPA award.

In February, 1977 an ISIS Control Group was formed and began bi-monthly meetings covering a standing agenda. Members of this group include Janice M. Olsen, ISIS Systems Manager and Chairman, ISIS Control Group; Donald D. Bridgwater, AAZPA-ISIS Representative; Kim Hastings, ISIS Data Processor; Leaura Pratt, ISIS Clerk-Typist; U.S. Seal, PhD., ISIS Co-founder; Dale G. Makey, PhD., ISIS Co-founder; Nathan Flesness, ISIS Consultant for Studbooks and Pedigree Analysis; and Paul Scobie, ISIS Consultant for Physiological Norms. The purpose of this group is to review on a regular basis the day-to-day operations of ISIS, including budgets, schedules, development programs, special problems, and related matters.

B. Staffing

In April, 1977, Janice M. Olsen, ISIS Development Coordinator, assumed the position of Systems Manager, ISIS, supported by the ISIS budget. She is responsible, with review and support from the ISIS Control Group, for general program supervision and management of funds, activities and operations. Kim Hastings provides data processing and clerical support for ISIS and is supported by the ISIS budget. Leaura Pratt, funded for one year through the CETA Program, provides full time clerical support for ISIS. Supported by the ISIS budget on part time contracts are Dale G. Makey, PhD., Systems Analysis Consultant; Nate Flesness, Programming Consultant for Studbook and Pedigree Analysis; and Paul Scobie, Programming Consultant for Physiological Norms.

C. Other Support Elements

Final responsibility for financial and policy matters rests with Donald D. Bridgwater, Director, Minnesota Zoological Garden. Mr. Bridgwater is also responsible for AAZPA-ISIS communications in his role as AAZPA-ISIS Representative.

Computer services are supplied by the Information Systems Division (ISD) of the State of Minnesota Department of Administration and by the University of Minnesota Computer System. All costs incurred are paid from the ISIS budget.

In addition, numerous individuals and organizations voluntarily give advice, review programs and make recommendations. Co-founders U. S. Seal and Dale G. Makey continue to give enormous quantities of time to the program.

III. PROGRAM AND OPERATIONS

A. General Statement

ISIS is divided into eight functional areas: 1) Mammalian Inventory; 2) Bird Inventory; 3) Reptile and Amphibian Inventory; 4) Fish Inventory; 5) Studbooks/Pedigree Analysis; 6) Physiological Norms; 7) Life Histories and 8) International Expansion.

B. Program Description, Schedules, and Operations

1. Mammal Inventory

The system has been operational for three years. 110 North American and European zoos are participating. These include 92 zoos paying the 1976 participation fees, 8 who have not paid and 10 new institutions. Of these 100 institutions, 84 are actively submitting data.

2. Bird Inventory

The Semiannual ISIS Species Distribution Report lists 7,751 living birds in the inventory. Data forms are being received from many participants now entering bird inventories, so this area is undergoing continuing growth. Revisions requested by reviewers of the ISIS Avian Taxonomy, Part II, are currently underway and the directory should be available this fall. (Participation is as indicated for mammals in Section B-1 above.)

3. Reptile and Amphibian Inventory

Development of the directory has begun through the volunteer efforts of U.S. Seal. Extensive literature collection, review, code assignments and editing should begin in January 1978. Some funds are currently available and if additional funding is provided, the directory could be available as early as July 1978.

4. Fish Inventory

A framework taxonomic directory is proposed complete to the family level. Within this framework, only those genera and species on Endangered lists or those of recommended exhibit interest would be listed. The system would allow additions as needed. Some funds are currently available and if additional funding is provided, the directory could be available in early 1979.

5. Studbooks/Pedigree Analysis

This area has been given an urgent priority and development is well underway. Pertinent papers by Nate Flesness and Tom Foose appear in Vol. 17 of the International Zoo Yearbook. When complete, this system will allow the development of pedigree, demographic, and genetic analysis for any species for which sufficient data is available. Such information can then be used to develop long-term breeding programs, identify predictable and desirable end products and supply a statistical basis for both taking or reintroduction schemes for endangered species. The system can incorporate current studbooks and has the potential to produce studbooks from data present in the ISIS Inventory Files. Nearly all studbook keepers have indicated a willingness to supply data and use the system. The Survival Service Commission, the Department of the Interior, and numerous concerned breeders both here and abroad have expressed hope that such a system can be developed. It is perhaps the most significant end product of the ISIS programs.

Initial seed money has been provided by the Minnesota Zoological Garden. Five other zoos have contributed \$100.00 each. The AAZPA has contributed \$10,817.00 in ISIS Fiscal Year 1977, to fund the first phase of this project. The development costs of this program are sizable and additional funding of \$11,000 is required.

6. Physiological Norms

This system is being developed with the support of the American Association of Zoo Veterinarians (AAZV) and several private foundations. It will permit the determination of statistical norms for a variety of laboratory tests and will provide clinical data on individual animals. Programming is proceeding, much data has been collected on a trial run basis, and the system should be fully operational in January, 1978. The AAZV provided \$2000.00 in February, 1977 toward program development. An additional \$9000.00 is required to make the program operational.

7. Life Histories

All development of this system has been postponed until all other systems are fully operational. Substantial funding will be required.

8. International Expansion and Coordination

International expansion continues, with the participation of the Rotterdam Zoo, Copenhagen Zoo, Zoological Society of London, the Jersey Wildlife Preservation Trust, and the Seafloor Aquarium, Nassau, Bahamas.

IV. PARTICIPATION

The following tables indicate both the type of participation and the financial support provided by institutions that have signed ISIS participation agreements. Payment or non-payment of 1974, 1975 and 1976 Participation Fees is indicated. The extent of participation is designated by the following codes:

- 0 - No data submitted
- 1 - Data either incomplete or not recently updated
- 2 - Update annually
- 3 - Update regularly
- 4 - Entering only portion of inventory

Table 1 includes all participants who have paid the 1976 Participation Fee as of 22 August 1977.

Table 2 includes all participants who have not yet paid the 1976 Participation Fee.

Table 3 lists new or recently active participants.

Table 4 lists former participants who have terminated their involvement in ISIS.

Letters of inquiry and second invoices have been sent to all unpaid participants who update regularly or annually. The remaining participants will be contacted, as time permits, to ascertain the reasons for inactivity.

TABLE 1

ISIS PARTICIPANTS - 1976 FEE PAID by 22 August 1977

PAID	CODE	
747576		
✓✓✓✓	1	Arizona - Sonora Desert Museum, Tucson, Arizona
✓✓✓✓	3	Assiniboine Park Zoo, Winnipeg, Manitoba, Canada
✓✓✓✓	1	Atlanta Zoological Park, Atlanta, Georgia
✓✓✓✓	3	Baltimore Zoo, Baltimore, Maryland
✓✓✓✓	3	Beardsley Zoological Gardens, Bridgeport, Connecticut
✓✓✓✓	3	Birmingham Zoo, Birmingham, Alabama
✓✓✓✓	3	Buffalo Zoological Gardens, Buffalo, New York
✓✓✓✓	3	Burnet Park Zoo, Syracuse, New York
✓✓✓✓	3	Busch Gardens, Tampa, Florida
✓✓✓✓	2	Caldwell Children's Zoo, Tyler, Texas
✓✓✓✓	3	Calgary Zoo and Natural History Park, Calgary, Alberta, Canada
✓✓✓✓	1	Cen-tex Zoo, Waco, Texas
✓✓✓✓	3	Cheyenne Mt. Zoo, Colorado Springs, Colorado
✓✓✓✓	3	Chicago Zoological Park, Brookfield, Illinois
✓✓✓✓	3	Zoological Society of Cincinnati, Cincinnati, Ohio
✓✓✓✓	3	Cleveland Aquarium, Cleveland, Ohio
✓✓✓✓	3	Cleveland Zoological Park, Cleveland, Ohio (METROPARKS)
✓✓✓✓	3	Cole Park Zoo, Midland, Texas
✓✓✓✓	3	Columbia Zoological Park, Columbia, South Carolina (Riverbanks)
✓✓✓✓	1	Crandon Park Zoological Garden, Key Biscayne, Florida
✓✓✓✓	2	Denver Zoological Gardens, Denver, Colorado
✓✓✓✓	2	Dickerson Park Zoo, Springfield, Missouri
✓✓✓✓	1	Dreher Park Zoological Gardens, West Palm Beach, Florida
✓✓✓✓	3	Duke University Primate Facility, Durham, North Carolina
✓✓✓✓	2	Duluth Zoo, Duluth, MN
✓✓✓✓	1	Ellen Trout Park Zoo, Lufkin, Texas
✓✓✓✓	1	El Paso Zoological Park, El Paso, Texas
✓✓✓✓	3	Erie Zoo, Erie, Pennsylvania
✓✓✓✓	3	Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
✓✓✓✓	3	Fort Worth Zoological Park, Fort Worth, Texas
✓✓✓✓	0	Gilbert, Mr. & Mrs. Frank H., Phoenix, Arizona
✓✓✓✓	3	Gladys Porter Zoo, Brownsville, Texas
✓✓✓✓	3	Glen Oak Zoo, Peoria, Illinois
✓✓✓✓	3	The Greater Baton Rouge Zoo, Baton Rouge, Louisiana
✓✓✓✓	3	Henry Doorly Zoo, Omaha, Nebraska
✓✓✓✓	1	Henry Vilas Park Zoo, Madison, Wisconsin
✓✓✓✓	1	Hogle Zoological Garden, Salt Lake City, Utah
✓✓✓✓	3	Houston Zoological Gardens, Houston, Texas
✓✓✓✓	3	Jackson Zoological Park, Jackson, Mississippi
✓✓✓✓	3	Jacksonville Zoological Park and Society, Jacksonville, Florida
✓✓✓✓	3	Jardin Zoologique de Quebec, Quebec, Canada
✓✓✓✓	3	Kansas City Zoological Gardens, Kansas City, Missouri
✓✓✓✓	3	Kings Dominion (Lion Country Safari), Doswell, Virginia
✓✓✓✓	3	Knoxville Zoological Park, Knoxville, Tennessee
✓✓✓✓	0	Las Vegas Valley Zoo, Las Vegas, Nevada
✓✓✓✓	1	Lee Richardson Zoo, Garden City Kansas
✓✓✓✓	2	Lincoln Municipal Zoo, Lincoln, Nebraska
✓✓✓✓	3	Lincoln Park Zoo, Chicago, Illinois
✓✓✓✓	3	Los Angeles Zoo, Los Angeles, California
✓✓✓✓	3	Milwaukee County Zoo, Milwaukee, Wisconsin
✓✓✓✓	3	Minnesota Zoological Garden, Apple Valley, Minnesota
✓✓✓✓	3	Montgomery Zoo, Montgomery, Alabama

ISIS PARTICIPANTS - 1976 FEE PAID by 22 August 1977 (Cont)

PAID	CODE	
747576		
✓✓✓3	3	National Zoological Park, Washington, D.C.
✓✓3	3	National Zoological Park Conservation Center, Front Royal, Virginia
✓3	3	National Zoological Parks Office of Zoological Research, Wash. D.C.
✓✓3	3	Natural Science Center, Greensboro, North Carolina
✓0	0	New England Aquarium, Boston, Massachusetts
✓✓✓3	3	New York Zoological Society, Bronx, New York
✓✓3	3	N.Y. Society St. Catherines Survival Center, St. Catherines Island, GA.
✓✓0	0	North Carolina Zoological Park, Asheboro, North Carolina
✓✓✓2	2	Oklahoma City Zoo, Oklahoma City, Oklahoma
✓✓✓3	3	Philadelphia Zoological Garden, Philadelphia, Pennsylvania
✓✓✓2	2	Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
✓✓✓3	3	Portland Zoological Gardens, Portland, Oregon (WASHINGTON PARK ZOO)
✓✓3	3	Ralph Mitchell Zoo, Independence, Kansas
✓✓✓3	3	Randolph Park Zoo, Tucson, Arizona
✓✓✓2	2	Rio Grande Zoo, Albuquerque, New Mexico
✓✓✓0	0	Roeding Park Zoo, Fresno, California
✓✓✓1	1	Roosevelt Park Zoo, Minot, North Dakota
✓✓✓3	3	St. Louis Zoological Park, St. Louis, Missouri
✓✓✓1	1	St. Paul's Como Zoo, St. Paul, Minnesota
✓✓✓3	3	The Salisbury Zoo, Salisbury, Maryland
✓✓✓2	2	San Antonio Zoological Gardens, San Antonio, Texas
✓✓✓3	3	San Diego Wild Animal Park, San Diego, California
✓✓✓3	3	San Diego Zoological Gardens, San Diego, California
✓✓✓1	1	Santa Barbara Zoological Gardens, Santa Barbara, California
✓✓✓3	3	Santa Fe Community College Teaching Zoo, Gainesville, Florida
✓0	0	The Seattle Aquarium, Seattle, Washington
✓✓3	3	Segwick County Zoo, Wichita, Kansas
✓✓3	3	Seneca Park Zoo, Rochester, New York
✓✓✓3	3	John G. Shedd Aquarium, Chicago, Illinois
✓✓2	2	South Bend Zoo (POTAWATOMI PARK), South Bend, Indiana
✓3	3	Stichting Koninklijke Rotterdamse Diergaarde, Rotterdam, Netherlands
✓1	1	Terry Lou Zoo, Scotch Plains, New Jersey
✓✓✓3	3	Topeka Zoological Park, Topeka, Kansas
✓✓✓3	3	Metro Toronto Zoo, West Hill, Ontario
✓✓✓3	3	Turtle Back Zoo, West Orange, New Jersey
✓✓✓3	3	Tulsa Zoo, Tulsa, Oklahoma
✓✓0	0	Vancouver Public Aquarium, Vancouver, British Columbia
✓3	3	Walt Disney World, Lake Buena Vista, Florida
✓✓✓2	2	Wild Canid Survival and Research Center, St. Louis, Missouri
✓✓1	1	Woodland Park Zoological Gardens, Seattle, Washington

TABLE 2

ISIS PARTICIPANTS - 1976 FEE UNPAID

PAID		CODE	
74	75		
		1	African Lion Safari, Rockton, Ontario, Canada
✓		0	African Lion Safari, Port Clinton, Ohio (INTERNATIONAL ANIMAL EXCHANGE)
✓		1	Akron Children's Zoo, Akron, Ohio
		0	Alabama-Coachatta Indian Reservation, Livingston, Texas
✓		0	Alexander Lindsay Junior Museum, Walnut Creek, California
		0	Alexandria Zoological Park, Alexandria, La.
		0	Amarillo Zoological Society, Amarillo, Texas
		0	Amigita Grande Ranch, Houston, Texas
		0	Aqua Circus - Aquarium of Cape Cod, West Yarmouth, Massachusetts
✓		0	Audubon Park, New Orleans, Louisiana
		0	Bear Country, U.S.A., Rapid City, South Dakota
		0	Big Bell Ranch, Eads, Tennessee
		0	Boise City Zoo, Boise, Idaho
✓		3	Boston Zoological Society, Dorchester, Massachusetts
		0	Warren E. Buck, Glendora, New Jersey
✓		1	Busch Gardens, L.A., Van Nuys, California
		1	Buttonwood Zoo, New Bedford, Massachusetts
		0	Catoctin Mountain Zoological Park, Thurmont, Maryland
		0	Cedar Bluff Aquarium, Ellis, Kansas
✓		2	Cohanzick Zoo, Bridgeton, New Jersey
		1	Columbus Zoological Gardens, Powell, Ohio
		0	Conservatory - Aviary, West Pittsburgh, Pennsylvania
		1	Dallas Zoo, Dallas, Texas
		1	Detroit Zoological Park, Royal Oak, Michigan
		1	Elmwood Park Zoo, Norristown, Pennsylvania
✓		1	Endangered Wildlife Research Program, Patuxent Center, Laurel, Maryland
		0	Forest Park Zoo, Springfield, Massachusetts
		0	Fort Clark Zoo Farm, Brackettville, Texas
		1	Great Plains Zoo, Sioux Falls, South Dakota
✓	✓	3	Highland Park Zoo, Highland Park, Pittsburgh, Pennsylvania
		0	Inland Empire Zoo, Spokane, Washington
✓	✓	3	Kamper Zoological Park, Hattiesburg, Mississippi
✓	✓	1	Lafayette Zoological Park, Norfolk, Virginia
✓	✓	1	Lincoln Children's Zoo, Lincoln, Nebraska
		0	Little Rock Zoo, Little Rock, Arkansas
		0	Living Desert Reserve, Palm Desert, California
✓		2	Louisville Zoological Garden, Louisville, Kentucky
		0	Lummis Livestock Co., Cheyenne, Wyoming
		0	Marineland of the Pacific, Rancho Palos Verdes, California
✓	✓	1	Marriott's Great America, Gurnee, Illinois
✓		3	Mesker Park Zoo, Evansville, Indiana
		0	Miami Seaquarium, Miami, Florida
✓	✓	1	Miller Park Zoo, Bloomington, Illinois
✓		0	Mystic Marinelife Aquarium, Mystic, Connecticut
		0	National Aquarium, Washington, D.C.
		0	Olympic Game Farm, Sequim, Washington
		1	Opryland, U.S.A., Nashville, Tennessee
		0	Oxbow Park Zoo, Rochester, Minnesota

ISIS PARTICIPANTS - 1976 FEE UNPAID (CONT)

PAID		CODE	
74	7576		
		0	Parque Zoologico National, Santo Domingo, Dominican Republic
		0	Rancho Gango Musk Ox Farm, Hughenden, Alberta, Canada
		0	Research Ranch, Elgin, Arizona
		0	Rock Island Co., Niabi Zoological Preserve, Moline, Illinois
✓		2	Roger Williams Zoo, Providence, Rhode Island
		0	Ross Park Zoo, Binghamton, New York
		0	Safari Animal Country, Inc., Northumberland, New York
✓		3	San Francisco Zoo, San Francisco, California
		0	Scripps Aquarium, La Jolla, California
		0	Sea Life Park, Waimanalo, Hawaii
✓		0	Snyders Darien Lake Zoo, Corfu, New York
		1	Southwest Zoological Gardens, Mangum, Oklahoma
		0	Spring Creek Animal Farm, Elko, Nevada
		0	Stanislaus Zoological Society, Modesto, California
		0	Staten Island Zoo, Staten Island, New York
		0	Sunset Zoo, Manhattan, Kansas
		0	Toledo Zoological Gardens, Toledo, Ohio
		0	Trailside Museums, Bear Mountain, New York
✓		1	Utica Zoo, Utica, New York
		0	Ven-Am Research Center, Cache, Oklahoma
		0	Vollrath Park Zoo, Sheboygan, Wisconsin
✓	✓	2	Wolf Park, Battle Ground, Indiana
✓		0	World Wildlife Safari, Winston, Oregon
		0	Zoo St. Felicien, St. Felicien, Quebec, Canada

TABLE 3

"NEW" 1977 PARTICIPANTS

PAID		CODE	
7475	76		
✓		0	Abilene Zoological Gardens, Abilene, Texas (rejoined)
		3	Copenhagen Zoologisk Have, Copenhagen, Denmark
		4	Zoological Society of London, London, England
		0	Honolulu Zoo, Honolulu, Hawaii
		0	Jersey Wildlife Preservation Trust, Channel Islands, British Isles
		0	Kings Island, Kings Mills, Ohio
		3	Nature Center, Asheville, North Carolina
		3	Racine Zoological Park, Racine, Wisconsin (activated participation)
✓		3	Sacramento Zoo, Sacramento, California
		3	Seafl oor Aquarium, Nassau, Bahamas

TABLE 4

DROPPED FROM ISIS

PAID		CODE	
7475	76		
		0	Brookgreen Gardens, Murrells Inlet, South Carolina
		0	Dakota Zoological Society, Inc., Bismarck, North Dakota
		0	City Park Zoo, Iowa City, Iowa
		0	Granby Zoological Society, Granby, Quebec, Canada
		0	Indianapolis Zoological Society Inc., Indianapolis, Indiana
		0	Jungle Larry's African Safari, Naples, Florida
		1	Knowland Park Zoo, Oakland, California
		0	Long Island Game Farm, Inc., Manorville, New York
		1	Okanagan Game Farm, Penticton, British Columbia
		1	Overton Park Zoo and Aquarium, Memphis, Tennessee
✓	✓	1	The Phoenix Zoo, Phoenix, Arizona
		1	T. Rowell, Primate Research, Univ. of Calif., Berkeley, California
		0	Storyland Valley Zoo, Edmonton, Alberta, Canada
		1	Warner Bros. Jungle Habitat, West Milford, New Jersey
		0	The Wildlife Preserve, Largo, Maryland
✓	✓	0	National Marine Fisheries Service Aquarium, Woods Hole, Mass.

V. BUDGETS

In this annual report, budgets have been reset to follow a fiscal year July 1 to June 30 as opposed to the earlier calendar year presentations.

Table 5 shows ISIS Income in Fiscal Year 1977 (1 July 1976 - 30 June 1977)

Table 6 shows ISIS Expenses for Fiscal Year 1977 (1 July 1976 - 30 June 1977)

Table 7 shows Projected ISIS Income in Fiscal Year 1978 (1 July 1977 - 30 June 1978)

Table 8 shows Projected ISIS Expenses for Fiscal Year 1978 (1 July 1977 - 30 June 1978)

In Fiscal Year 1977, income from participation fees totaled \$26,671.70 while operating expenses totaled \$45,096.39 -- leaving a deficit of \$18,424.69 which had to be made up from funds designated for development. Participation fees covered only 60% of the operating expenses in this period.

In Fiscal Year 1978, operating expenses are estimated to be \$54,150.00 while the combined income from late payment of 1976 fees and timely payment of the 1977 participation fees (based on current zoo responses) is estimated to be only \$29,000.00 -- leaving a deficit of \$25,000.00.

In summary, current and potential income from participation fees, based on past performance, will cover 60% of the ISIS operating expenses. Additional funds are required either from:

1. Increased financial participation from signed member institutions.
2. Changes in rate structure.
3. Financial subsidy from private individuals, foundations, institutions, or user agencies.

TABLE 5
 ISIS INCOME - FISCAL YEAR 1977
(1 July 1976 - 30 June 1977)

<u>Source</u>	<u>Receipts</u>
1975 Zoo Participation Fees (Paid in Fiscal Year 1977)	5,258.00
1976 Zoo Participation Fees (Paid in Fiscal Year 1977)	21,413.70
USDI 30 July 1976	10,000.00
14 October 1976	10,000.00
29 November 1976	15,000.00
Minnesota Zoological Society	100.00
AAZV	2,000.00
AAZPA	10,817.00
Studbook Contribution	100.00
Special Demand Reports	210.00
Directories	435.01
Miscellaneous Contributions	163.45
Fiscal Year 1975 Surplus Reset in Fiscal Year 1977	160.63
Fiscal Year 1976 Surplus Reset in Fiscal Year 1977	<u>3,528.81</u>
 TOTAL ISIS INCOME - FISCAL YEAR 1977	 <u><u>\$79,186.60</u></u>

TABLE 6
 ISIS EXPENSES - FISCAL YEAR 1977
(1 July 1976 - 30 June 1977)

<u>Budget Item</u>	<u>Detail</u>	<u>Total</u>
Operations:		
Salaries and Fringe Benefits		26,392.60
Systems Manager	14,526.00	
Data Entry Operator	8,276.10	
Fringe Benefits	3,590.50	
Data Processing		12,058.54
Operations	8,620.44	
Maintenance	2,182.14	
Modification of Report Format	1,255.96	
Printing (forms, stationary, miscellaneous)		2,885.68
Postage		1,937.26
Addressograph		32.79
Supplies		403.97
Repairs		92.70
Miscellaneous		15.43
Travel		264.42
State Indirect Cost Billing		<u>1,013.00</u>
SUBTOTAL ISIS OPERATIONS EXPENSES		45,096.39
Development:		
Data Processing		14,257.63
Physiological Norms	1,572.23	
Studbook/Pedigree Analysis	12,685.40	
Printing (Taxonomy)		3,059.89
Consultants		5,170.50
Graphics Arts	70.50	
Physiological Norms	2,900.00	
Studbook/Pedigree Analysis	2,200.00	
SUBTOTAL ISIS DEVELOPMENT EXPENSES		<u>22,488.02</u>
TOTAL ISIS EXPENSES - FISCAL YEAR 1977		<u>\$67,584.46</u>

TABLE 7
 ISIS PROJECTED INCOME - FISCAL YEAR 1978
(1 July 1977 - 30 June 1978)

<u>Source</u>	<u>Anticipated Receipts</u>
1976 Zoo Participation Fees Paid in Fiscal Year 1978 (\$1,665.81 received to date)	3,000.00
1977 Zoo Participation Fees (Estimate based on current rates: \$1.00 per mammal, \$.35 per bird)	26,000.00
USDI	10,000.00
Special Demand Reports	500.00
Directories	500.00
Miscellaneous Contributions	100.00
Fiscal Year 1977 Surplus Reset in Fiscal Year 1977	<u>11,600.00</u>
TOTAL PROJECTED INCOME - FISCAL YEAR 1978	<u><u>\$51,700.00</u></u>

Additional funds required to balance budget through 30 June 1978	\$28,450.00
---------------------------------------------------------------------	-------------

TABLE 8
 ISIS PROJECTED EXPENSES - FISCAL YEAR 1978
 (1 July 1977 - 30 June 1978)

<u>Budget Item</u>	<u>Detail</u>	<u>Total</u>
Operations:		
Salaries and Fringe Benefits		29,650.00
Systems Manager	15,900.00	
Data Entry Operator	9,100.00	
Fringe Benefits	4,650.00	
Data Processing		14,000.00
Operations (20% increase)	10,400.00	
Maintenance	2,600.00	
Modifications	1,000.00	
Printing (forms, stationary, miscellaneous)		3,000.00
Postage		2,450.00
Addressograph		50.00
Supplies		600.00
Repairs		100.00
Miscellaneous		100.00
Travel		2,600.00
Equipment		400.00
State Indirect Cost Billings		<u>1,200.00</u>
SUBTOTAL PROJECTED OPERATIONS EXPENSES		54,150.00
Development:		
Data Processing		18,000.00
Physiological Norms	9,000.00	
Studbook/Pedigree Analysis	9,000.00	
Printing (Taxonomy)		5,000.00
Consultants		3,000.00
Studbook/Pedigree Analysis	2,000.00	
Other	1,000.00	
SUBTOTAL PROJECTED DEVELOPMENT EXPENSES		<u>26,000.00</u>
TOTAL PROJECTED EXPENSES - FISCAL YEAR 1978		<u><u>\$80,150.00</u></u>

VI. RECOMMENDATIONS AND SUMMARY

A review of the information contained in the body of this report indicates a number of areas of both progress and concern relative to the International Species Inventory System operation.

The primary objective is, and should continue to be, the development of the international census of animals in captivity including mammals, birds, reptiles, amphibians and fish. Data continues to flow in and a rhythm of regular updating is being established. There is still an urgent need for members that have signed up to pay fees and to begin active data submission in order to make the ISIS system even more effective. Beyond this, the development of a working studbook and pedigree analysis subsystem continues to be a second priority. The physiological norms subsystem is developing a pace with the support of the American Association of Zoo Veterinarians and is proceeding on schedule with additional funding needed to make it operational.

International expansion is proceeding well while the life histories system is still being postponed until other systems are operational.

An analysis of the Budgets section shows that at the present time, only 60% of the day-to-day ISIS operating expenses is covered through subscriptions. This year, after long subsidy and support by the Minnesota Zoological Garden, the salaries of the Systems Manager was shifted to the operational income from ISIS. This, along with some miscellaneous expenses and program updating, indicates that in Fiscal Year 1978 there could be an estimated deficit of some \$25,000. In the summary paragraph on page 11, sources of additional funds are identified.

The primary problem continues to be one of working relationships and understandings amongst member institutions and the AAZPA Board relative to what ISIS is, what it can do, what it could do if properly supported.

Since the dissolution of the Computer Data Committee for AAZPA-ISIS Committee there has become an increasing polarization relative to this entire problem. During the Mid-Year Board Meeting, President Hubbell did appoint a committee under the coordination of Bob Wagner including Don Farst, Dennis Meritt and Don Bridgwater, to attempt to develop a working relationship for review in San Diego in September. To date, this has not been done. Therefore, the primary recommendation from this report is that this group actively meet in an attempt to develop a set of recommendations for operation during the coming AAZPA year. Areas which need exploration are the following: 1) AAZPA-ISIS working relationship; 2) funding provisions; 3) clear definitions of ISIS capabilities; 4) the identification of agreed-upon programs which can be written and generated on instant recall for AAZPA purposes; 5) logical fee and support structures.



Minnesota Zoological Garden
12101 Johnny Cake Ridge Road
Apple Valley, Minnesota 55124
Telephone (612) 432-9000

A Program of the American Association
of Zoological Parks and Aquariums

August 25, 1977

Mr. Robert O. Wagner, Executive Director
American Association of Zoological Parks and Aquariums
Oglebay Park
Wheeling, West Virginia 26003

Dear Bob:

Please find enclosed appropriate copies of the AAZPA-ISIS Annual Report. As discussed on the phone today, I will look forward to a communication relative to the possibility of a series of meetings in San Diego with regard to the ISIS program.

Best regards,

A handwritten signature in dark ink, appearing to read "Donald D. Bridgwater". The signature is fluid and cursive, with the first name being the most prominent.

Donald D. Bridgwater
AAZPA-ISIS Representative

DDB/je

Enclosures

AAZPA ISIS PROGRAM

MIDYEAR REPORT

4 MARCH, 1977

To:

OFFICERS AND DIRECTORS

of the

AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

From:

DONALD D. BRIDGWATER
AAZPA ISIS REPRESENTATIVE
MINNESOTA ZOOLOGICAL GARDEN
12101 JOHNNY CAKE RIDGE ROAD
APPLE VALLEY, MINNESOTA 55124

HEREIN IS PRESENTED A SUMMARY OF ACTIVITIES,
SUPPORTING DATA AND RECOMMENDATIONS FOR ACTION
WITH RESPECT TO THE AAZPA-ISIS PROGRAM

Respectfully submitted:

Donald D. Bridgwater
Donald D. Bridgwater, AAZPA-ISIS Representative

Linda Murtfeldt
Linda Murtfeldt, ISIS Systems Manager

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I. INTRODUCTION

This document comprises the midyear AAZPA-ISIS program report to the officers and directors of the American Association of Zoological Parks and Aquariums. The period covered is from 3 September, 1976 through 4 March, 1977.

II. CURRENT ORGANIZATION

A. Structure

Following the 1976 AAZPA annual meeting, the AAZPA-ISIS Committee and its substructure was dissolved by the AAZPA Board. Chairman Donald D. Bridgwater was appointed AAZPA ISIS Representative and placed as a non-voting representative on the new Wildlife Conservation and Management Committee. There were no communications issued relative to this action or as to how ISIS was to relate to the WCMC. A series of phone calls and correspondence between President Hubbell, Executive Director Robert Wagner, WCMC Chairman Dennis Meritt and Donald Bridgwater finally charted an interim course of action as follows:

1. The ISIS letterhead will be retained with the addition of the words "A program of the American Association of Zoological Parks and Aquariums".
2. As was done under the old ISIS Committee structure, I will periodically (depending on volume) at two to four week intervals send copies of pertinent correspondence to Dennis Meritt for his information. This gives the flavor of the day-to-day operations, questions and problems which the ISIS system encounters.
3. All reports, papers or related material which either discusses policy or publicly represents AAZPA-ISIS will be sent to Dennis Meritt for review and then forwarded to appropriate parties.
4. For purposes of identification I will simply sign all correspondence for the present as AAZPA-ISIS Representative.
5. Queries or complaints regarding ISIS by the Conservation Committee or members of the Board will be directed to Donald Bridgwater immediately for solution in an effort to avoid circumstances such as the concern over alphabetization of the Avian Taxonomic Directory.

In February, 1977 an ISIS Control Group (ISISCG) was formed and began bi-monthly meetings covering a standing agenda. Members of this group include Donald D. Bridgwater, Chairman; Linda Murtfeldt, ISIS Systems Manager; Janice Olsen, Development Coordinator; Kim Hastings, ISIS Data Processor; U. S. Seal, PhD, ISIS Co-founder; Dale G. MaKey, PhD, ISIS Co-founder; Nathan Flesness, ISIS Consultant for Studbooks and Pedigree Analysis; and Paul Scobie, ISIS Consultant for Physiological Norms. The purpose of this group is to review on a regular basis the day-to-day operations of ISIS including budgets, schedules, development programs, special problems and related matters. The increasing growth, volume and complexity of the program simply dictated the need for this approach. In short, AAZPA-ISIS is growing!

B. Staffing

Beginning 1 April, 1977 Janice Olsen who has been Development Coordinator will become Systems Manager of ISIS, supported by the ISIS budget. Linda Murtfeldt will move into the position of Zoological Records Supervisor for the Minnesota Zoological Garden. Kim Hastings provides data processing, filing and some clerical support; while Dale MaKey, PhD continues as Systems Analyst and Programming Consultant under part-time contract. Nate Flesness and Paul Scobie under part-time contracts are developing the Studbook-Pedigree Analysis and Physiological Norms Subsystems. This staff is now fully supported by ISIS budgets. A one-year employee, through the CETA Program, is being sought to cover additional workload in data processing and clerical areas.

C. Other Support Elements

General supervision, management of funds, activities and operations is given by Donald Bridgwater with the support of the previously noted ISIS Control Group. Computer services are supplied by the Information Systems Division (ISD) of the State of Minnesota and the University of Minnesota Computer System paid from ISIS budgets.

In addition, numerous individuals and organizations give advice, review programs and make recommendations as a volunteer service which could not be afforded otherwise. Co-founders U. S. Seal and Dale Makey continue to give enormous quantities of time to the program.

III. PROGRAM AND OPERATIONS

A. General Statement

ISIS is now divided into eight (8) specific functions: 1) Mammals Inventory; 2) Birds Inventory; 3) Reptiles and Amphibians Inventory; 4) Fish Inventory; 5) Studbooks/Pedigree Analysis; 6) Physiological Norms; 7) Life Histories, and 8) International Expansion. Mammals and birds are now operational, International Expansion is progressing and items 3, 4, 5, 6, and 7 are in varying stages of start-up.

A new schedule is being drawn up for presentation in September, 1977.

B. Program Description, Schedules and Operations

1. Mammals: This system has been operational for 2 1/2 years. 112 North American and 3 European institutions are actively participating. The data base for live mammals is now 21,975. The 3rd annual zoo inventory, zoo acquisition and release and species distribution reports were mailed in February, 1977 to 115 institutions with invoices. Four semi-annual reports have been provided to requesting institutions. The budget is operational with some additional start-up costs for minor program revisions and refinements.

2. Birds: The Avian Taxonomic Directory, Part I was completed and mailed to all active participants in December, 1976. All active institutions had earlier received data forms and first portions of the directory in May, 1976. Part II, containing the Passeriformes will be ready for distribution in May, 1977.

In the 1976 Species Distribution report, 4,663 specimens were recorded from 45 institutions. We expect 50% complete entries by September, 1977. The funds for final start-up are available and the budget is considered operational.

3. Reptiles and Amphibians: Systems analysis has begun. Start-up costs will be similar to the birds. Some funds are available now and provided additional funds this system could be operational by July, 1978 with data input complete by September, 1979. Development of the Directory has begun through the volunteer efforts of U.S. Seal. Permission has been granted by Stanley W. Gorham, PhD., the New Brunswick Museum to use his Checklist of World Amphibians as a base for the directory. With funding and cooperative volunteer reviewers the directory could be complete by January, 1978.

4. Fish: A framework taxonomic directory is proposed, complete to family level. Within this framework only those genera and species on Endangered lists or those of recommended exhibit interest would be listed. The system would allow additions as needed. With funding this program could be operational by January, 1978.

5. Studbook/Pedigree Analysis Subsystem: This Subsystem has been given an urgent priority. The theoretical development is well under way. It will allow the development of pedigree outputs, demographic and genetic analysis for any species for which data is available. Such information can then be used to develop long-term breeding programs, identify predictable and desirable end products and supply logical judgemental data for both taking or reintroduction schemes for endangered species. It can incorporate both current and future studbook programs including historical data in a permanent coordination base and as a management tool. Nearly all studbookers have indicated their willingness to supply data and use the system. The Survival Service Commission, Department of the Interior, and numerous concerned breeders both here and abroad have expressed hope that such a system can be early developed. It is perhaps the most significant end product of the ISIS System.

Major theoretical work has been started. If sufficient funding is obtained the system could be completed, debugged and operational by October, 1977. Pertinent papers by Nate Flesness and Tom Foose will be published in Vol. 17 of the International Zoo Yearbook. Initial seed money has been provided by the Minnesota Zoological Garden. Five other zoos have contributed \$100.00 each. The AAZPA contributed \$6,000.00 in January, 1977 and has indicated that it will consider at midyear an additional \$4,817.00 to complete Phase one. We urge this further support.

6. Physiological Norms: This subsystem is being developed with the support of the American Association of Zoo Veterinarians (AAZV) and several private foundations. It will enable the development of statistical norms for a variety of laboratory tests. It will link this data to individual animals as well. Systems Analysis is virtually complete. Much data has been collected on a trial run basis and the system will be operational by October, 1977. The AAZV provided \$2,000.00 in February, 1977 and only \$3,000.00 is yet needed for completion.

7. Life Histories: Systems Analysis has been postponed until all other systems are operational. Substantial funding will be required.

8. International Expansion and Coordination: Expansion of AAZPA ISIS internationally continues. Through the efforts of Marvin Jones, mammal data forms have been completed for both Rotterdam and Copenhagen. In February, 1977 the Zoological Society of London indicated that they are ready to begin data submission on their apes and large monkeys.

IV. PARTICIPATION

A. North America

One hundred sixty-six (166) United States and Canadian institutions have agreed to participate and received working materials. The status of these institutions are given in Tables 1 and 2 and 3.

1. Table 1 lists 120 "active" participants.
2. Table 1A lists 86 institutions who are currently submitting data and have paid the 1975 fee (52% of the original signed participants).
3. Table 1B lists 5 institutions who are submitting data but have not paid the 1975 fee.
4. Table 1C lists 21 institutions who have paid the 1975 fee but are not submitting data.
5. Table 1D lists 8 new (1976) participants currently submitting data.
6. Table 2 lists inactive participants.
7. Table 2A lists 42 institutions never submitting data or paying the 1975 fee, (nine of these hold no mammals).

8. Table 2B lists 9 institutions who have signed but have not submitted data or paid in 1975.

9. Table 2C lists 16 institutions who have withdrawn from the system. Ten never submitted data.

All tables indicate type of data submitted and fee payments.

B. International

Currently there are 3 active Zoos; Rotterdam, Copenhagen and London.

VII. BUDGETS

Funds for birds and mammals start-up have been achieved.

Table 3 shows basic operational cost estimates for 1977 and 1978 and assumes new program monies will be secured to achieve an orderly operational status for such programs.

Table 4 shows projected income for 1977.

Table 5 details expenses 1 January, 1974 through 1 February, 1977.

A. Current Budget Statement

Table 6 shows total receipts from ISIS start-up 1 January, 1974 to 1 March, 1977, (Total \$141,886.45) less expenses (\$136,400.53). Leaving net operating funds of \$5,485.92.

No attempt has been made to account for free volunteer hours, free consultants or other at no cost services. Estimates of such figures run near \$200,000 over a 7-year period.

In 1977, \$48,100 will be needed for operations. This money must be generated by subscription fees from participating institutions. It is imperative that the February billings be promptly honored in accordance with the AAZPA's action to make such payments mandatory beginning 1 July, 1975.

B. Proposed Operational Budgets

Table 3 indicates a projected operating budget of \$67,500 in 1978, reflecting increases in data handling, mailing and other communications. There will be the need for a full time clerical in 1978, in addition to 2 full time staff.

C. Proposed Start-up Program Budgets

Table 7 is the estimated start-up budget for studbook/pedigree analysis. The AAZPA has provided \$6,000 for a portion of Phase I. If the balance of \$4,817 can be provided in April, all systems analysis and basic programs can be complete by May, 1977. We are seeking funds for Phase II.

Table 8 shows the estimated start-up budget for reptiles and amphibians.

Table 9 shows the estimated start-up budget for fish.

Table 10 shows the estimated start-up budget for life histories.

In summary, current and potential income indicate a healthy status for mammals and birds operational and on-going. \$4,817 is needed to complete Phase I of the studbook and pedigree analysis; \$3,000 is needed to complete the Physical Norms program, while aid is needed to begin other programs and finish the studbook and pedigree analysis start-up Phase II.

VI. RECOMMENDATIONS

Based on this report AAZPA-ISIS respectfully requests the Officers and Board of the AAZPA to consider and approve the following recommendations at its midyear meeting April, 1977.

1. That an additional \$4,817.00 be provided to AAZPA-ISIS for completion of Phase I of the Studbook and Pedigree Analysis Subsystem.
2. That the priority schedule of development for new programs be accepted as presented in this report.
3. That the budgets herein presented be accepted.
4. That strong encouragement to participate in AAZPA ISIS be promulgated in the areas of data submission and fee payments.
5. That assistance in the development of funding for new program costs be provided.
6. That appropriate steps be taken to re-establish an effective and operational AAZPA-ISIS Committee by October, 1977.
7. That Ms. Linda Murtfeldt, outgoing ISIS Systems Manager be placed in nominations for the highest appropriate award in recognition for an outstanding, if not phenomenal performance in initiating, organizing and running the ISIS office from 1972 to 1 April, 1977.

ACTIVE ISIS PARTICIPANTS

1975 FEE PAID & CURRENTLY SUBMITTING DATA*

TABLE 1-A

(# on 76 report	Birds submitted (# on 75 report	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species di	
56			56		✓	✓	Akron Children's Zoo, Akron, Ohio
10		92	92		✓	✓	Arizona - Sonora Desert Museum, Tucson, Arizona
356	78	400	400		✓	✓	Assiniboine Park Zoo, Winnipeg, Manitoba, Canada
36		170	130		✓	✓	Atlanta Zoological Park, Atlanta, Georgia
355	207	406	406		✓	✓	Baltimore Zoo, Baltimore, Maryland
116	16	83	109		✓	✓	Beardsley Zoological Gardens, Bridgeport, Connecticut
248	14	320	250		✓	✓	Birmingham Zoo, Birmingham, Alabama
255	190	271	259		✓	✓	Buffalo Zoological Gardens, Buffalo, New York
133	106	174	174		✓	✓	Burnet Park Zoo, Syracuse, New York
86			92		✓	✓	Caldwell Children's Zoo, Tyler, Texas
250	258	234	213		✓	✓	Calgary Zoo and Natural History Park, Calgary, Alberta, Canada
528		800	800		✓	✓	Chicago Zoological Park, Brookfield, Illinois
328		300	351		✓	✓	Zoological Society of Cincinnati, Cincinnati, Ohio
4		4	4		✓	✓	Cleveland Aquarium, Cleveland, Ohio
300			318		✓	✓	Cleveland Zoological Park, Cleveland, Ohio (Metroparks)
59	28		49		✓	✓	Cohanzick Zoo, Bridgeton, New Jersey
30		49	49		✓	✓	Cole Park Zoo, Midland, Texas
179	164	182	199		✓	✓	Columbia Zoological Park, Columbia, South Carolina (Riverbanks)
471			491		✓	✓	Denver Zoological Gardens, Denver, Colorado
6			40		✓	✓	Dreher Park Zoological Gardens, West Palm Beach, Florida
253			255		✓	✓	Duke University Primate Facility, Durham, North Carolina
106			108		✓	✓	Duluth Zoo, Duluth, Minnesota
75	11	74	70		✓	✓	Erie Zoo, Erie, Pennsylvania
159	25	106	140		✓	✓	Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
156	228		155		✓	✓	Fort Worth Zoological Park, Fort Worth, Texas
403	379	459	432		✓	✓	Gladys Porter Zoo, Brownsville, Texas
80	11	107	79		✓	✓	Glen Oak Zoo, Peoria, Illinois
221			203		✓	✓	The Greater Baton Rouge Zoo, Baton Rouge, Louisiana
308	112	310	321		✓	✓	Henry Doorly Zoo, Omaha, Nebraska
26			273		✓	✓	Henry Vilas Park Zoo, Madison, Wisconsin
161		281	281		✓	✓	Highland Park Zoo, Highland Park, Pittsburgh, Pennsylvania
13			415		✓	✓	Hogle Zoological Garden, Salt Lake City, Utah
517			540		✓	✓	Houston Zoological Gardens, Houston, Texas
154	94	240	155		✓	✓	Jackson Zoological Park, Jackson, Mississippi
222			213		✓	✓	Jacksonville Zoological Park and Society, Jacksonville, Florida
203		220	201		✓	✓	Jardin Zoologique de Quebec, Quebec, Canada
49	104	38	41		✓	✓	Kemper Zoological Park, Hattiesburg, Mississippi
318	34	317	362		✓	✓	Kansas City Zoological Gardens, Kansas City, Missouri
85		85	88		✓	✓	Lafayette Zoological Park, Norfolk, Virginia
54	4	57	51		✓	✓	Lincoln Children's Zoo, Lincoln, Nebraska
120(110)			106		✓	✓	Lincoln Municipal Zoo, Lincoln, Nebraska
777			770		✓	✓	Lincoln Park Zoo, Chicago, Illinois
635		480	527		✓	✓	Los Angeles Zoo, Los Angeles, California
216			187		✓	✓	Louisville Zoological Garden, Louisville, Kentucky
19		29	20		✓	✓	Marriott's Great America, Gurnee, Illinois
215	34		165		✓	✓	Mesker Park Zoo, Evansville, Indiana
17		25	17		✓	✓	Miller Park Zoo, Bloomington, Illinois
513	197		456		✓	✓	Milwaukee County Zoo, Milwaukee, Wisconsin
10	1	8	8		✓	✓	Minnesota Zoological Garden, Apple Valley, Minnesota
88	55	96	97		✓	✓	Montgomery Zoo, Montgomery, Alabama

(# on 76 report)	Birds submitted (# on 76 report)	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species dis	
497	30	480	522		✓	+	National Zoological Park, Washington, D. C.
112	6		66		✓		National Zoological Park Conservation Center, Front Royal, Virginia
149					✓		National Zoological Parks Office of Zoological Research, Washington, D. C.
35	11		36		✓	+	Natural Science Center, Greensboro, North Carolina
228	203	747	787		✓	+	New York Zoological Society, Bronx, New York
30			21		✓		New York Society's St. Catherines Survival Center, St. Catherine Island, Georgia
631	79	568	546		✓	+	Oklahoma City Zoo, Oklahoma City, Oklahoma
337	27	374	355		✓	+	Philadelphia Zoological Garden, Philadelphia, Pennsylvania
180		163	168		✓	+	Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
253	38	221	251		✓	+	Portland Zoological Gardens, Portland, Oregon (Washington Park Zoo)
69	18		63		✓	+	Ralph Mitchell Zoo, Independence, Kansas
137	90	136	120		✓	+	Randolph Park Zoo, Tucson, Arizona
192		33	160		✓	+	Rio Grande Zoo, Albuquerque, New Mexico
81			81		✓	+	Roger Williams Zoo, Providence, Rhode Island
74		76	75		✓	+	Roosevelt Park Zoo, Minot, North Dakota
425	130	531	430		✓	+	St. Louis Zoological Park, St. Louis, Missouri
144	24	143	145		✓	+	St. Paul's Como Zoo, St. Paul, Minnesota
64	183	47	61		✓	+	The Salisbury Zoo, Salisbury, Maryland
172		740	728		✓	+	San Antonio Zoological Gardens, San Antonio, Texas
951		643	773		✓	+	San Diego Wild Animal Park, San Diego, California
840		900	795		✓	+	San Diego Zoological Garden, San Diego, California
377			523		✓	+	San Francisco Zoo, San Francisco, California
105	10	103	110		✓	+	Santa Barbara Zoological Gardens, Santa Barbara, California
55	15	48	40		✓	+	Santa Fe Community College Teaching Zoo, Gainesville, Florida
92	6		120		✓	+	Sedgwick County Zoo, Wichita, Kansas
158	167		139		✓	+	Seneca Park Zoo, Rochester, New York
3		3	3		✓	+	John G. Shedd Aquarium, Chicago, Illinois
81	3		221		✓	+	South Bend Zoo (Potawatomi Park) South Bend, Indiana
109	130	127	116		✓	+	Topeka Zoological Park, Topeka, Kansas
906	737	606	861		✓	+	Metro Toronto Zoo, West Hill, Ontario
157	98	193	156		✓	+	Tulsa Zoological Park, Tulsa, Oklahoma
135	88	197	132		✓	+	Turtle Back Zoo, West Orange, New Jersey
118			117		✓	+	Utica Zoo, Utica, New York
14		12	16		✓	+	Wild Canid Survival and Research Center, St. Louis, Missouri
14			8		✓	+	Wolf Park, Battle Ground, Indiana (formerly):
12		10	12		✓		(North American Predatory Animal Center, Doyle, California)
							(North American Wildlife Park Foundation, Inc.)
388			387		✓	+	Woodland Park Zoological Gardens, Seattle, Washington

TABLE 1-B

ACTIVE ISIS PARTICIPANTS
CURRENTLY SUBMITTING DATA/1975 FEE NOT PAID

(# on 76 report)	Birds submitted (# on 76 report)	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species dis	
70					✓	4	African Lion Safari, Rockton, Ontario, Canada
75					✓	4	Buttonwood Zoo, New Bedford, Massachusetts
315					✓	4	Dallas Zoo, Dallas, Texas
28					✓	4	Detroit Zoological Park, Royal Oak, Michigan
86	16	100			✓	4	Dickerson Park Zoo, Springfield, Missouri

TABLE 1-C

ACTIVE ISIS PARTICIPANTS

1975 FEE PAID/NOT CURRENTLY SUBMITTING DATA

(# on 76 report	Birds submitted (# on 76 report	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species di	
			200			4	African Lion Safari, Port Clinton, Ohio (International Animal Exchange)
			48			4	Alexander Lindsay Junior Museum, Walnut Creek, California
184			184		✓	4	Boston Zoological Society, Dorchester, Massachusetts (3 Zoos)
14			23		✓	4	Busch Gardens, L. A., Van Nuys, California
			282			4	Crandon Park Zoological Garden, Key Biscayne, Florida
32			52		✓	4	Ellen Trout Park Zoo, Lufkin, Texas
87		100	87		✓	4	El Paso Zoological Park, El Paso, Texas
			5			4	Endangered Wildlife Research Program, Patuxent Center, Laurel, Maryland
			19			4	Gilbert, Mr. and Mrs. Frank H., Phoenix, Arizona
22			173		✓	4	Knoxville Zoological Park, Knoxville, Tennessee
			40			4	Las Vegas Valley Zoo, Las Vegas, Nevada
			13			4	Mystic Marinelife Aquarium, Mystic, Connecticut
		2	2			4	National Marine Fisheries Service Aquarium, Woods Hole, Massachusetts
			56			4	North Carolina Zoological Park, Asheboro, North Carolina
		182	182			4	Roeding Park Zoo, Fresno, California
			225			4	Sacramento Zoo, Sacramento, California
			50			4	Snyder's Darien Lake Zoo, Corfu, New York
			18			4	Vancouver Public Aquarium, Vancouver, British Columbia
28			246		✓	4	World Wildlife Safari, Winston, Oregon

TABLE 1-D

ACTIVE ISIS PARTICIPANTS

CURRENTLY SUBMITTING DATA/NEW 1975 PARTICIPANT

# on 76 report	Birds submitted (# on 76 report	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species di	
705					✓	✓	Busch Gardens, Tampa, Florida
454					✓	✓	Cheyenne Mt. Zoo, Colorado Springs, Colorado
					✓	✓	Copenhagen Zoologisk Have
66					✓	✓	Kings Dominion (Lion Country Safari), Doswell, Virginia
123					✓	✓	Stichting Koninklike Rotterdamse Diergaarde
48					✓	✓	TerryLou Zoo, Scotch Plains, New Jersey
163					✓	✓	Walt Disney World, Lake Buena Vista, Florida
					✓	✓	Zoological Society of London, London, England

TABLE 2-B

INACTIVE ISIS PARTICIPANTS

1975 FEE NOT PAID/NOT CURRENTLY SUBMITTING DATA

(# on 76 report)	Birds submitted (# on 76 report)	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species dis
		160				Audubon Park, New Orleans, Louisiana
8					✓	Cen-tex Zoo, Waco, Texas
22					✓	Columbus Zoological Gardens, Powell, Ohio
42					✓	Elmwood Park Zoo, Norristown, Pennsylvania
92					✓	Great Plains Zoo, Sioux Falls, South Dakota
12					✓	Lee Richardson Zoo, Garden City, Kansas
14					✓	Opryland, U. S. A., Nashville, Tennessee
7					✓	Southwest Zoo-ogical Gardens, Mangum, Oklahoma
20					✓	Trailside Museums, Bear Mountain, New York

TABLE 2-C

INACTIVE ISIS PARTICIPANTS

DROPPED FROM SYSTEM

Participants submitted (# on 76 report)	Birds submitted (# on 76 report)	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species dis	
		178					Abilene Zoological Gardens, Abilene, Texas
							Brookgreen Gardens, Murrells Inlet, South Carolina
							Dakota Zoological Society, Inc., Bismarck, North Dakota
							City Park Zoo, Iowa City, Iowa
							Granby Zoological Society, Granby, Quebec, Canada
							Indianapolis Zoological Society, Inc., Indianapolis, Indiana
							Jungle Larry's African Safari, Naples, Florida
61							Knowland Park Zoo, Oakland, California
5							Long Island Game Farm, Inc., Manorville, New York
105							Okanagan Game Farm, Penticton, British, Columbia
201		168	203				Overton Park Zoo and Aquarium, Memphis, Tennessee
17							The Phoenix Zoo, Phoenix, Arizona
							T. Rowell, Primate Research, Univ. of California, Berkeley, California
							Storyland Valley Zoo, Edmonton, Alberta, Canada
21							Warner Bros, Jungle Habitat, West Milford, New Jersey
							The Wildlife Preserve, Largo, Maryland

TABLE 3
INTERNATIONAL SPECIES INVENTORY SYSTEM
PROJECTED ANNUAL OPERATING COSTS

<u>BUDGET CATEGORY</u>	<u>1977</u>	<u>1978</u>
Salaries & Fringes		
Data Processor	9,000	10,000
Systems Manager	15,300	15,500
Clerk Typist		10,000
Data Assembly, Printouts, Computer		
Time and Key punch Rental	15,000	20,000
Printing		
Data Forms, Cards, Correspondence	2,000	3,400
Telephone and Mailing Costs	2,500	2,500
Travel	2,500	2,500
Systems Analysis and Programming	1,000	1,500
Office Supplies	500	600
Equipment	200	400
Memberships and Subscriptions	<u>100</u>	<u>100</u>
TOTAL	<u>\$48,100</u>	<u>\$67,500</u>

TABLE 4
INTERNATIONAL SPECIES INVENTORY SYSTEM
PROJECTED RECEIPTS - 1977

	<u>ANTICIPATED</u>
Participation Fees	
Mammals	\$ 29,000
Birds	1,600
USDI	10,000
Special Reports	300
Other Grants, Gifts and Donations	<u>7,200</u>
TOTAL	<u>\$48,100</u>

TABLE 5
INTERNATIONAL SPECIES INVENTORY SYSTEM
EXPENSES

January 1, 1974 - February 1, 1977

Salaries	\$ 30,989.83
Printing	24,405.77
Purchased Services	18,017.46
Computer Services	49,009.95
Communications ^a	5,999.06
Travel	4,883.24
Freight and Delivery	5.00
Other Contractual	356.25
Supplies	1,599.42
Equipment ^b	<u>1,134.55</u>
Total Expenditures	<u>\$136,400.53</u>
<hr style="border-top: 1px dashed black;"/>	
Total Receipts	<u>\$141,886.45</u>
Balance of Support Funds - February 1, 1977	<u>\$ 5,485.92</u>

^a Does not include telephone, xeroxing and office space supplied by the Minnesota Zoological Garden

^b Office Furnishings supplied by the Minnesota Zoological Garden

TABLE 6
INTERNATIONAL SPECIES INVENTORY SYSTEM
RECEIPTS

January 1, 1974 - - March 1, 1977

AAZPA (1973)	\$ 2,500.00
Earl C. Sams Foundation, Inc. (1973)	10,000.00
Franke1 Foundation (1974)	3,500.00 5,000.00
AAZV (1973)	1,000.00
USDI (1974-75)	10,000.00
USDI (1975)	20,000.00
AAZPA (1974)	10,000.00
AAZPA (1976)	6,000.00
AAZV (1974)	3,500.00
AAZV (1976)	2,000.00
Franke1 Foundation (For Physiological Norms) (1975)	5,000.00
Zoo Participation Fees (63 Zoos) (1974)	14,495.00
Zoo Participation Fees (103 zoos) (1975)	22,044.00
Fees for Extra ISIS Directories	1,130.00
Fees for Demand Reports	188.45
Individual Donations for Studbook Development	500.00
Animal Keepers Forum (1976)	29.00
USDI (1976)	<u>25,000.00</u>
	<u>\$141,886.45</u>

Receipts to Date	\$141,886.45
Less Expenses to Date	<u>136,400.53</u>
Net Operating Funds	<u>\$ 5,485.92</u>

TABLE 7
INTERNATIONAL SPECIES INVENTORY SYSTEM
COST ESTIMATES
PEDIGREE ANALYSIS SUBSYSTEM

PHASE I

<u>Segment 1</u>		
120 hrs	Systems Analysis (\$13.75/hr)	\$1,650.00
150 hrs	Programming (\$11.50/hr)	1,725.00
	Computer and Equipment	<u>340.00</u>
		\$3,715.00

<u>Segment 2</u>		
50 hrs	Systems Analysis	\$ 687.00
80 hrs	Programming	920.00
	Computer and Equipment	<u>240.00</u>
		1,847.00

<u>Segment 3</u>		
180 hrs	Systems Analysis	\$2,475.00
50 hrs	Programming	550.00
	Computer and Equipment	<u>200.00</u>
		3,225.00

<u>Segment 4</u>		
40 hrs	Systems Analysis	\$ 500.00
120 hrs	Programming	1,380.00
	Computer and Equipment	<u>150.00</u>
		<u>2,030.00</u>

TOTAL PHASE I	<u><u>\$10,817.00</u></u>
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PHASE II

<u>Segment 5</u>		
Final Review, Correction and Program Revision (Phase 8 Program)		<u>3,000.00</u>
		3,000.00

<u>Segment 6</u>		
Incorporation of Existing Studbook Data		7,000.00
		<u>7,000.00</u>

TOTAL PHASE II	<u><u>\$10,000.00</u></u>
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TOTAL PHASE I AND PHASE II	<u><u>\$20,817.00</u></u>
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TABLE 8
INTERNATIONAL SPECIES INVENTORY SYSTEM
REPTILE/AMPHIBIAN START-UP BUDGET

Taxonomy Directory Preparation	\$ 8,500.00
Collection of Literature Review, Assignment of Numbers and Editing Consultant Review	
Keypunching and Computer Input	5,500.00
Printing and Design	
Taxonomic Directories	4,800.00
Data Forms	3,000.00
Design (directory cover)	200.00
Systems Analysis and Programming	4,500.00
Mailing Expenses	<u>3,500.00</u>
	<u>\$30,000.00</u>

TABLE 9
INTERNATIONAL SPECIES INVENTORY SYSTEM
FISH START-UP BUDGET

Taxonomy Directory Preparation	\$ 1,000.00
Collection of Literature Review, Assignment of Numbers and Editing Consultant Review	
Keypunching and Computer Input	4,000.00
Printing and Design	
Taxonomic Directories	2,000.00
Data Forms	2,000.00
Design (directory cover)	200.00
Systems Analysis and Programming	3,500.00
Mailing Expenses	<u>2,300.00</u>
	<u>\$15,000.00</u>

TABLE 10
INTERNATIONAL SPECIES INVENTORY SYSTEM
LIFE HISTORY DEVELOPMENT AND IMPLEMENTATION
Two Years (1977-1978)

Systems Analysis and Programming	12,900.00
Clerk-Typist	2,000.00
Systems Manager (20% time)	6,000.00
Records Keeper (10%-20% time)	4,000.00
Keypunching and Computer Input	5,000.00
Data Assembly, Printouts and Computer Time	5,000.00
Design - Data Forms	100.00
Printing	
Instructions	500.00
Data Forms (10,000)	500.00
Annual Reports	1,000.00
Correspondence Expenses	<u>3,000.00</u>
	<u>\$40,000.00</u>

AAZPA ISIS COMMITTEE

ANNUAL REPORT

3 SEPTEMBER 1976

To:

OFFICERS AND DIRECTORS
of the
AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

From:

DONALD D. BRIDGWATER, CHAIRMAN
DIRECTOR, MINNESOTA ZOOLOGICAL GARDEN
APPLE VALLEY, MINNESOTA 55124

HEREIN IS PRESENTED A SUMMARY OF ACTIVITIES,
SUPPORTING DATA AND RECOMMENDATIONS FOR ACTION
WITH RESPECT TO THE AAZPA ISIS COMMITTEE AND PROGRAM.

Respectfully submitted:


Donald D. Bridgwater, Chairman


Lee Simmons, Vice Chairman

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I. INTRODUCTION

This report comprises the AAZPA ISIS committee's annual report of budget, activities and recommendations as of 3 September, 1976.

II. CURRENT ORGANIZATION

A. Committee Structure

Following the 1975 AAZPA Conference, the AAZPA Computer Data Committee has been renamed AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS INTERNATIONAL SPECIES INVENTORY SYSTEM.

The committee is now structured as follows:

General Operations and Planning

Donald D. Bridgwater, Chairman, St. Paul, Minnesota
Lee Simmons, D.V.M., Vice Chairman, Omaha, Nebraska
Clayton Freiheit, Denver, Colorado
John Mehrtens, Arlington, Virginia
Peter Karsten, Calgary, Alberta, Canada
David Z. Zucconi, Tulsa, Oklahoma
U. S. Seal, PhD., Minneapolis, Minnesota
Paul N. Linger, Jr., Denver, Colorado

This committee is charged with the overall direction, evaluation, planning, and function of the ISIS operations.

In addition by AAZPA action, two subcommittees have been established as follows:

Life Histories Subcommittee

Paul N. Linger, Jr., Chairman, Denver, Colorado
Hal Markowitz, PhD, Portland, Oregon
Judith Block, Washington, D.C.
Peter Covey, Omaha, Nebraska
Dave Banks, Calgary, Alberta, Canada
John Wortman, Topeka, Kansas

This subcommittee is charged with the development of a life histories data storage and retrieval system. Additional members and contributors are the responsibility of its chairman.

Planning and Development Subcommittee for Studbooks

Donald D. Bridgwater, Chairman, St. Paul, Minnesota
Alan Shoemaker, (Presidential Advisor on Studbooks)
Columbia, South Carolina
Charles Wilson, Little Rock, Arkansas
Judith Block, Washington, D.C.
Devra Kleiman, PhD., Washington, D.C.
Marvin Jones, San Diego, California
Saul Kitchener, San Francisco, California
Mark Rosenthal, Chicago, Illinois
Peter Covey, Omaha, Nebraska

This committee is charged with the development of an international studbook system and pedigree analysis system for incorporation in the ISIS format, the development of a worldwide studbooking system, the evaluation of current and proposed studbooks and recommendations for their operation as envisioned by the AAZPA Board when it declared the intent to establish such a group.

B. Staffing

Day to day operation of ISIS is the responsibility of Mrs. Linda Murtfeldt, Systems Manager, whose support comes from the Minnesota Zoological Garden as its Zoological Records Supervisor. Data form processing, physiological norms development and some computer programming are provided by Ms. Jan Olsen, who is supported by the ISIS budget. Data processing, filing, and some clerical support are provided by Miss Kim Hastings, who is supported by the ISIS budget. Systems analysis, programming, and continuing evaluation is provided by Dr. Dale Makey on a consultant basis, supported by the ISIS budget.

C. Other Support Elements

General supervision, management of funds, activities, and operations is given by the general committee, but in the hands-on, day to day sense, is provided by the chairman, vice-chairman, and the systems originator, Dr. U. S. Seal. These activities are on a volunteer basis except for minimal travel expenses. Computer services are supplied by the State of Minnesota, Information Systems Division, and is paid for from ISIS budget. Preliminary work on studbook and pedigree analysis and data input is being provided under contract with Minnesota Zoological Garden by Dr. Nate Flesness, Department of Biochemistry, University of Minnesota, and by Marvin Jones, San Diego, California, and Tom Foose, University of Chicago. Marvin Jones, through association with other institutions, particularly San Diego, Portland, Rotterdam, Netherlands, Antwerp, Belgium and Copenhagen, Denmark, has supplied or will supply data for entry into the system.

In addition, numerous individuals and organizations continue to give advice, review programs and make recommendations as a volunteer service which could be afforded in no other way.

III. PROGRAM AND OPERATIONS

A. General Statement

ISIS is divided into nine specific functions as follows: 1) Mammals Inventory; 2) Birds Inventory; 3) Reptiles and Amphibians Inventory; 4) Fish Inventory; 5) Studbooks/Pedigree Analysis; 6) Physiological Norms; 7) Life Histories; 8) International Expansion; and 9) Special Reports. These functions generally consist of two major cost-time elements: start-up and ongoing operation. The entire program is well ahead of the original schedule, with the mammal and bird inventories in operation.

B. Program Description, Schedules and Operations

1. Mammals: The system has been operational for two years. 111 American and three European institutions are actively participating with data forms for over 30,000 of the projected 36,000 possible mammal entries for North America in the system. The second annual zoo inventory, zoo acquisition and release, and species distribution reports were mailed in February 1976 to 111 participants along with invoices. 84 participants have returned fee payments to ISIS. The system should achieve 100% completion by participating institutions by December 1976. Semi-annual reports have been produced on demand for four institutions. The budget is operational with no additional start-up costs.

2. Birds: The Avian Taxonomic Directory is complete, with the exception of the Passeriformes, and is scheduled to be mailed out to all active participants in late September. All actively participating institutions received data forms and the first portion of the taxonomy in May. A series of trial runs have been accomplished and the system is debugged.

Over 600 avian specimens were recorded on the 1975 Species Distribution Report, covering 12 zoos. Currently, 29 zoos have submitted data on over 1,700 specimens. It is anticipated that the data will be 30% complete by December 1976, and 80% complete by September 1977. Funds for final start-up are available and the budget is considered an operational subscription-supported element.

3. Reptiles and Amphibians: Systems analysis has begun, modeled along the lines of the mammal and bird system. Start-up costs will be similar to that for birds. Some funds are now available. Provided additional funds, the entire program can be developed in 1976-77 and can be operational by December 1977, and all data input complete by September 1978. Ongoing operations would be supported by service fees.

4. Fish: The problem of dealing with a complete fish taxonomy dictionary is felt beyond the scope of any foreseeable need. For this group of vertebrates, a framework taxonomy is proposed which would be complete to the family level, but within families would consider only those genera and species on the Endangered Species List and certain species of recommended exhibit interest in this country.

This framework would be flexible and would allow the addition of any additional species later recognized as either endangered or threatened. Included in this listing would be all species on the treaty list of the "Convention on International Trade in Endangered Species of Wild Fauna and Flora". Development of the taxonomy portion of this project has begun through the volunteer efforts of Dr. U. S. Seal. With funding, this portion of the project could be complete and operational by the end of 1977.

5. Studbook/Pedigree Analysis Subsystem: This activity has as its major objective the development of a pedigree output and analysis program which would allow detailed tracing of the history of an individual animal throughout its life and through transfer of ownership. It would also allow identification of parentage and offspring and their location and/or fates. Current or future studbooks and other historical information would be incorporated with the end result being the ability to generate a format allowing pedigree presentation, analysis and genetic analysis for any selected species. This information can then be used to develop broad range breeding programs through the use of unifying data and coordination.

A second objective is the unification and coordination of studbook activity. ISIS would not and could not replace the need for individual studbookers but would provide a permanent coordination base and a management tool for species survival.

Preliminary work on this system has started and if funded could be developed, debugged and made operational by April 1977. Pertinent papers by Nate Flesness and Tom Foote are being prepared for publication. Its development and operation is the prime concern of the AAZPA's Planning and Development Subcommittee for Studbooks under AAZPA's ISIS Committee. Initial seed money was made available for the pedigree analysis in 1975 by the Minnesota Zoological Garden. Four other zoos have also each contributed \$100 toward this project in 1976.

6. Physiological Norms: This project is being developed with the assistance of the American Association of Zoo Veterinarians (AAZV) and at least two private foundations. It will be a subsystem of ISIS, and the clinical and laboratory data will be linked to individual animal ISIS ID numbers. It will also be used to develop a set of statistical norms on a wide range of laboratory tests for use by veterinarians in their clinical care and management of animals in captivity. This program will further enhance our ability to evaluate the status of endangered species held in captivity, and more particularly, ascribe causes in greater detail to difficulties that might occur in these animals on an ongoing basis. We will, of course, collect not only normal data but data from animals being treated or examined for reasons of disease.

Systems Analysis for this program is complete as are data forms. Already much data has been collected on a trial run basis and the entire system will be operational by July 1977. Current and anticipated start-up funds presently appear short by \$5,000 go cover the costs of this system. Further evaluation of this program is given in an article published in the Journal of Zoo Animal Medicine, 1976, Vol. 7, No. 1.

7. Life Histories: Systems analysis on this program has been postponed for 1 to 2 years until all other subsystems are fully functional. This subcommittee program has been ongoing for some 24 months under the leadership of Paul Linger, in cooperation with ISIS staff and many zoo professionals. A trial run form was developed and distributed in 1975 to 25 institutions. Further coding work has been accomplished by Dr. Hal Markowitz and his associates but much further development is necessary.

The Life History program is designed to collect data on important life events including breeding, reproduction, diet, behavioral requirements, behavioral characteristics and veterinary clinical information on individual animals. The data again will be referenced to the ISIS ID number of individual animals. It will then be possible to collate it by species, as well as providing a very detailed segment of the life history of a given animal which can be tied to the clinical information, pedigree information, and any other kinds of information that are subsequently developed. It will provide a data base for assisting in diagnosing difficulties encountered in a course of management of captive populations. It will also provide a valuable data base which could be used for evaluation of species in their wild habitat and as a basis for developing management strategies and for identifying specific studies that might need to be undertaken in the field.

8. International Expansion and Coordination: Efforts to expand ISIS to include zoos on an international basis are being actively pursued and well received. Already supporting data and information exchange is taking place and some international input has been accomplished for mammals, through the efforts of Marvin Jones, who has completed data forms for three European zoos (Rotterdam, Copenhagen, and Antwerp).

ISIS was presented to the IUDZG in Colorado Springs in October 1975, to the Survival Service Commission of IUCN in May 1976, and to the second World Conference on Breeding Endangered Species in Captivity in London in July of 1976.

Donald D. Bridgwater, Director of the Minnesota Zoological Garden and chairman of AAZPA ISIS Committee has been appointed to the commission as AAZPA representative. Also, Dr. U. S. Seal has been appointed as a special consultant to the Survival Service Commission (SSC) for a period of approximately two years. Dr. Seal and Mr. Bridgwater attended the Survival Service Commission meeting in Morges, Switzerland May 11 and 12. A presentation of the ISIS system, including vital statistics, pedigree, studbook and demography development was given and received enthusiastic response from all present. A proposal for a new Captive Breeding Population Specialist Group within the Survival Service Commission was presented formally and at the request of the SSC chairman is being drawn up under the leadership of Mr. Bridgwater with approval expected by January 1977.

Mr. Bridgwater, U. S. Seal, Nate Flesness and Tom Foose attended the second World Conference on Breeding Endangered Species in Captivity in London. A paper on the AAZPA ISIS program was presented and published in the IZY.

9. Special Reports: Throughout the year the ISIS program data bank supplied information for use in evaluating a number of actions relative to control and regulation of captive animal species. These reports included 1) data supplied

in support of the down listing of the tiger, jaguar, black lemur, ring-tailed lemur, and leopard; 2) a status report on gaur in American zoos; 3) a status report used in developing responses relative to the addition of 27 primates to the United States list of endangered species; and 4) a status report of the squirrel monkey with regard to those held in zoological gardens in the United States.

In addition to these reports, papers were presented or published with regard to the AAZPA ISIS program at the American Association for the Advancement of Science annual meeting, IUCN Survival Service Commission meeting, second International Conference on Endangered Species, paper in the Journal of Zoo Animal Medicine, and a presentation to the Association of Systematic Collections, a group attempting to similar program with museum specimens.

IV. PARTICIPATION

A. North America

Currently 172 U.S. and Canadian institutions have signed agreements to participate in the ISIS program and received the necessary materials to proceed. The status of these participants is given in Table 1 and 2. Table 1 lists 105 "active" ISIS participants. Table 1-A lists 70 institutions who are currently submitting data and who have paid the 1975 fee. These represent 40% of the total number of institutions originally agreeing to participate. Table 1-B lists 16 institutions who are currently submitting data, but have not paid the 1975 fee. Table 1-C lists 15 institutions who have paid the 1975 fee, but are not currently submitting data. Table 1-D lists 5 institutions who are new 1976 participants and are currently submitting data.

Table 2 lists "inactive" ISIS participants. Table 2-A lists 48 institutions who have never submitted data and have not paid the 1975 fee. Eleven of these institutions, however, do not hold any mammals. Table 2-B lists 18 institutions who have signed up as participants but who are not currently submitting data and have not paid the 1975 fee. Table 2-C lists 11 institutions who have dropped from the system. All lists show details of participation as to type of forms received and fee payments.

B. International

During the spring and summer of 1976, three European zoos have contracted with Marvin Jones to enter their mammal data into the ISIS system. Data has now been received from the Rotterdam Zoo. Mr. Jones has also completed forms for Copenhagen and Antwerp.

VII. BUDGETS

During the past year, a detailed analysis of budgetary needs has been carried out in relation to the tactical program schedule (Appendix I). This analysis has resulted in the division of costs into two categories: 1) ongoing operational costs, and 2) new program and start-up costs. Table 5 indicates basic operational cost estimates over the next three years and assumes that concurrent new program monies will provide for the orderly development of new programs as indicated in the tactical schedule. The budget principle here is to create a situation where shared user fees or grants by those individuals, institutions or agencies using the system will equal the basic operational costs. Table 6 indicates projected receipts for 1976.

Funds for the start-up of mammals and birds have been achieved.

Tables 7, 8, 9 and 10 indicate costs for start-up of reptiles and amphibians, fish, studbook and pedigree analysis and life histories.

A. Current Budget Statement

The current budget is presented in two parts covering January 1, 1974, generally considered to be the starting date of ISIS, through September 1, 1976.

Table 3 indicates total receipts. No attempt is made to account for the hundreds of volunteer hours and support expenses provided by various individuals and institutions, so these numbers reflect only actual funds received or expended specifically for the ISIS program. \$114,564.00 has been received.

In Table 4, expenses have been categorized and total \$111,704.07, leaving a current balance on hand of \$2,859.93 for continued operations.

Referring to Table 5, the ISIS Projected Annual Operating Cost, covering 1976, 1977, and 1978, we estimated an operating budget need for 1976 of \$42,300. This money must be generated through the payment for services by participating institutions and it is imperative that response to the billings sent out in February along with the first reports and a second billing sent out in September be honored in accordance with the AAZPA action to make such payments mandatory beginning July 1, 1975.

We hope that a large number of institutions currently on the inactive list will begin to participate. We further hope that the addition of birds to the system will enable some institutions to participate more actively.

B. Proposed Operational Budgets

Referring to Table 5, we have projected basic operating costs through the next three years as follows: 1976 - \$42,300; 1977 - \$55,500¹; 1978 - \$65,000.

¹This budget could be low in the printing and distribution section if international expansion proceeds quickly.

Other than reflected increases for increased data handling, mailing and communications, a full time records keeper was added in April 1976 and there will be the need for a full time clerk-typist beginning in 1977.

Thus, in 1978, with all programs discussed in this report operational, ISIS would consist of three support staff members full time, with management accomplished on a voluntary basis. Currently there are three full time positions, one of which is supported by the Minnesota Zoological Garden.

C. Proposed Program for Budgets

Table 7 indicates preliminary budget and start-up costs for the reptile and amphibian system, to be accomplished in 1976-77.

Table 8 indicates budget and start-up costs for fish.

Table 9 indicates budget and start-up costs for the life history development system. It is our recommendation that this subsystem be delayed for one to two years. Volunteer development by a handful of zoo personnel will continue during this period.

Table 10 indicates cost estimates for the ISIS studbook and pedigree analysis system. This system is perhaps the most crucial currently being considered and is divided into six segments. It will take approximately 8 months to accomplish segments one through four beginning immediately. We are requesting that the AAZPA underwrite the cost of complete systems analysis and programming covering segments one through four in the amount of \$10,817. Segments 5 and 6 estimate the funds needed for final review and data incorporation.

In summary, current and potential income appears sufficient to maintain the ISIS operation. Additional grant funds must be sought and are currently being sought from various foundation, individuals and agencies for reptiles and amphibians, fish, life histories, and studbooks/pedigree analysis subsystems. Success in these areas is imperative if ISIS is to proceed in an orderly manner.

VI. RECOMMENDATIONS

Upon consideration of the content of this report, the American Association of Zoological Parks and Aquariums ISIS Committee respectfully requests the following recommendations be approved by the officers and directors of the American Association of Zoological Parks and Aquariums at its annual meeting, October 1976:

1. It is recommended that support for the development of the pedigree analysis subsystem and studbooks through segment 4 be supported by the American Association of Zoological Parks and Aquariums, and that funds in the amount of \$10,817 be transferred to ISIS to cover these costs during the year 1976-1977. This is a most needed new program and without this support we cannot further develop this program.
2. It is recommended that the AAZPA Board continue to accept the revised tactical program schedule as is presented in this report.
3. It is recommended that the AAZPA Board approve the tentative budget projections with provision of annual and semi-annual review as the needs and data become more clearly defined.
4. It is recommended that the AAZPA Board continue to consider ways of making ISIS participation more professional and ways of encouraging AAZPA institutions to participate more actively.

TABLE 1-A.

ACTIVE ISIS PARTICIPANTS

1975 FEE PAID & CURRENTLY SUBMITTING DATA*

Mammal Forms Received	Mammals Complete	Bird Forms Received	Birds Complete	Paid 1974	Paid 1975
✓				92.00	92.00
✓				400.00	400.00
✓	✓	✓		83.00	109.00
✓	✓	✓		320.00	25.00
✓	✓			271.00	259.00
✓	✓				92.00
✓	✓			234.00	213.00
✓				300.00	351.00
✓	✓			4.00	4.00
✓					318.00
✓	✓				49.00
✓				49.00	49.00
✓	✓	✓		182.00	199.00
✓	✓				491.00
✓					40.00
✓	✓				255.00
✓					108.00
✓	✓			74.00	70.00
✓	✓	✓		106.00	140.00
✓	✓	✓			155.00
✓	✓	✓		459.00	432.00
✓	✓			107.00	79.00
✓	✓				203.00
✓	✓	✓		316.00	321.00
✓				281.00	281.00
✓	✓				540.00
✓	✓			240.00	155.00
✓	✓				213.00
✓	✓			220.00	201.00
✓	✓	✓		38.00	41.00
✓	✓	✓		317.00	362.00
✓	✓			85.00	88.00
✓	✓			57.00	57.00
✓	✓				106.00
✓	✓				770.00
✓	✓			480.00	522.00
✓	✓				187.00
✓	✓			25.00	17.00
✓	✓				456.00
✓	✓			8.00	8.00
✓	✓	✓		480.00	522.00
✓	✓	✓			66.00
✓	✓	✓		749.00	789.00
✓	✓			10.00	12.00
✓	✓				8.00
✓	✓	✓		374.00	355.00
✓	✓			163.00	168.00
✓	✓	✓		221.00	251.00
✓	✓			136.00	120.00
✓	✓				81.00
✓				75.00	75.00

Arizona - Sonora Desert Museum, Tucson, Arizona
 Assiniboine Park Zoo, Winnipeg, Manitoba, Canada
 Beardsley Zoological Gardens, Bridgeport, Connecticut
 Birmingham Zoo, Birmingham, Alabama
 Buffalo Zoological Gardens, Buffalo, New York
 Caldwell Children's Zoo, Tyler, Texas
 Calgary Zoo and Natural History Park, Calgary, Alberta, Canada
 Zoological Society of Cincinnati, Cincinnati, Ohio
 Cleveland Aquarium, Cleveland, Ohio
 Cleveland Zoological Park, Cleveland, Ohio (Metroparks)
 Cohanzick Zoo, Bridgeton, New Jersey
 Cole Park Zoo, Midland, Texas
 Columbia Zoological Park, Columbia, South Carolina
 Denver Zoological Gardens, Denver, Colorado
 Dreher Park Zoological Gardens, West Palm Beach, Florida
 Duke University Primate Facility, Durham, North Carolina
 Duluth Zoo, Duluth, Minnesota
 Erie Zoo, Erie, Pennsylvania
 Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
 Fort Worth Zoological Park, Fort Worth, Texas
 Gladys Porter Zoo, Brownsville, Texas
 Glen Oak Zoo, Peoria, Illinois
 The Greater Baton Rouge Zoo, Baton Rouge, Louisiana
 Henry Doorly Zoo, Omaha, Nebraska
 Highland Park Zoo, Highland Park, Pittsburgh, Pennsylvania
 Houston Zoological Gardens, Houston, Texas
 Jackson Zoological Park, Jackson, Mississippi
 Jacksonville Zoological Park and Society, Jacksonville, Florida
 Jardin Zoologique de Quebec, Quebec, Canada
 Kamper Zoological Park, Hattiesburg, Mississippi
 Kansas City Zoological Gardens, Kansas City, Missouri
 Lafayette Zoological Park, Norfolk, Virginia
 Lincoln Children's Zoo, Lincoln, Nebraska
 Lincoln Municipal Zoo, Lincoln, Nebraska
 Lincoln Park Zoo, Chicago, Illinois
 Los Angeles Zoo, Los Angeles, California
 Louisville Zoological Garden, Louisville, Kentucky
 Miller Park Zoo, Bloomington, Illinois
 Milwaukee County Zoo, Milwaukee, Wisconsin
 Minnesota Zoological Garden, Apple Valley, Minnesota
 National Zoological Park, Washington, D.C.
 National Zoological Park Conservation Center, Front Royal, Virginia
 New York Zoological Society, Bronx, New York
 North American Predatory Animal Center, Doyle, California
 North American Wildlife Park Foundation, Inc., Battle Ground, Indiana
 Philadelphia Zoological Garden, Philadelphia, Pennsylvania
 Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
 Portland Zoological Gardens, Portland, Oregon
 Randolph Park Zoo, Tucson, Arizona
 Roger Williams Zoo, Providence, Rhode Island
 Roosevelt Park Zoo, Minot, North Dakota

ACTIVE ISIS PARTICIPANTS

1975 FEE PAID & CURRENTLY SUBMITTING DATA
(continued)

Mammal Forms Received	Mammals Complete	Bird Forms Received	Birds Complete	Paid 1974	Paid 1975
✓	✓				21.00
✓	✓			531.00	430.00
✓	✓	✓	✓	143.00	145.00
✓	✓	✓	✓	47.00	61.00
✓				740.00	728.00
✓	✓			643.00	773.00
✓				900.00	795.00
✓	✓	✓	✓	103.00	110.00
✓	✓			48.00	40.00
✓	✓	✓	✓		105.00
✓	✓	✓	✓		137.00
✓	✓			3.00	3.00
✓					231.00
✓	✓			27.00	116.00
✓	✓			606.00	861.00
✓	✓	✓	✓	193.00	156.00
✓	✓	✓	✓	194.00	132.00
✓	✓			12.00	16.00
✓	✓	✓	✓		387.00

St. Catherines Survival Center, St. Catherine Island, Georgia
 St. Louis Zoological Park, St. Louis, Missouri
 St. Paul's Como Zoo, St. Paul, Minnesota
 The Salisbury Zoo, Salisbury, Maryland
 San Antonio Zoological Gardens, San Antonio, Texas
 San Diego Wild Animal Park, San Diego, California
 San Diego Zoological Garden, San Diego, California
 Santa Barbara Zoological Gardens, Santa Barbara, California
 Santa Fe Community College Teaching Zoo, Gainesville, Florida
 Sedgwick County Zoo, Wichita, Kansas
 Seneca Park Zoo, Rochester, New York
 John G. Shedd Aquarium, Chicago, Illinois
 South Bend Zoo (Potawatomi Park), South Bend, Indiana
 Topeka Zoological Park, Topeka, Kansas
 Metro Toronto Zoo, West Hill, Ontario
 Tulsa Zoo, Tulsa, Oklahoma
 Turtle Back Zoo, West Orange, New Jersey
 Wild Canid Survival and Research Center, St. Louis, Missouri
 Woodland Park Zoological Gardens, Seattle, Washington

*Data submitted during past six months.

Mammal Forms Received	Mammals Complete	Bird Forms Received	Birds Complete	Paid 1974	Paid 1975
✓				406.00	
✓	✓	✓		174.00	
✓				800.00	
✓					
✓	✓	✓		100.00	
✓	✓	✓		29.00	
✓	✓	✓		96.00	
✓	✓	✓		568.00	
✓	✓	✓		193.00	
✓	✓				
✓	✓				

TABLE 1-B.
ACTIVE ISIS PARTICIPANTS
CURRENTLY SUBMITTING DATA/1975 FEE NOT PAID

Baltimore Zoo, Baltimore, Maryland
Burnet Park Zoo, Syracuse, New York
Chicago Zoological Park, Brookfield, Illinois
Dallas Zoo, Dallas, Texas
Detroit Zoological Park, Royal Oak, Michigan
Dickerson Park Zoo, Springfield, Missouri
Hogle Zoological Garden, Salt Lake City, Utah
Marriott's Great America, Gurnee, Illinois
Mesker Park Zoo, Evansville, Indiana
Montgomery Zoo, Montgomery, Alabama
Natural Science Center and Zoo, Inc., Greensboro, North Carolina
Oklahoma City Zoo, Oklahoma City, Oklahoma
Ralph Mitchell Zoo, Independence, Kansas
Rio Grande Zoo, Albuquerque, New Mexico
San Francisco Zoo, San Francisco, California
Utica Zoo, Utica, New York

Mammal Forms Received	Mammals Complete	Bird Forms Received	Birds Complete	Paid 1974	Paid 1975
					200.00
					48.00
				170.00	130.00
✓					282.00
✓	✓				32.00
✓	✓				5.00
✓					19.00
✓					198.00
					13.00
				2.00	2.00
					56.00
					225.00
					50.00
					18.00
					246.00

TABLE 1-C.
ACTIVE ISIS PARTICIPANTS
1975 FEE PAID/NOT CURRENTLY SUBMITTING DATA

African Lion Safari, Port Clinton, Ohio (International Animal Exchange)
Alexander Lindsay Junior Museum, Walnut Creek, California
Atlanta Zoological Park, Atlanta, Georgia
Crandon Park Zoological Garden, Key Biscayne, Florida
Ellen Trout Park Zoo, Lufkin, Texas
Endangered Wildlife Research Program, Patuxent Center, Laurel, Maryland
Gilbert, Mr. & Mrs. Frank H., Phoenix, Arizona
Knoxville Zoological Park, Knoxville, Tennessee
Mystic Marinelife Aquarium, Mystic, Connecticut
National Marine Fisheries Service Aquarium, Woods Hole, Massachusetts
North Carolina Zoological Park, Asheboro, North Carolina
Sacramento Zoo, Sacramento, California
Snyder's Darien Lake Zoo, Corfu, New York
Vancouver Public Aquarium, Vancouver, British Columbia
World Wildlife Safari, Winston, Oregon

TABLE 1-D.

ACTIVE ISIS PARTICIPANTS

CURRENTLY SUBMITTING DATA/NEW 1975 PARTICIPANT

Mammal Forms Received	Mammals Complete	Bird Forms Received	Birds Complete	Paid 1974	Paid 1975
✓	✓				
✓	✓				
✓	✓				
		✓			

Busch Gardens, Tampa, Florida
 Kings Dominion (Lion Country Safari), Doswell, Virginia
 Stichting Koninklike Rotterdamse Diergaarde
 Terry Lou Zoo, Scotch Plains, New Jersey
 Walt Disney World, Lake Buena Vista, Florida

TABLE 3.
INTERNATIONAL SPECIES INVENTORY SYSTEM
RECEIPTS

January 1, 1974 - September 1, 1976

AAZPA (1973)	\$ 2,500.00
Earl C. Sams Foundation, Inc. (1973)	10,000.00
Franke1 Foundation (1974)	3,500.00
	5,000.00
AAZV (1973)	1,000.00
USDI (1974-75)	10,000.00
USDI (1975)	20,000.00
AAZPA (1974)	10,000.00
AAZV (1974)	3,500.00
Franke1 Foundation (For Physiological Norms) (1975)	5,000.00
Zoo Participation Fees (63 zoos) (1974)	14,495.00
Zoo Participation Fees (84 zoos) (1975)	18,055.00
Fees for Extra ISIS Directories	915.00
Fees for Demand Reports	170.00
Individual Donations for Studbook Development	400.00
Animal Keepers Forum (1976)	29.00
USDI (1976)	<u>10,000.00</u>
	<u>\$114,564.00</u>
Receipts to Date	\$114,564.00
Less Expenses to Date	<u>111,704.07</u>
Net Operating Funds	<u>\$ 2,859.93</u>

TABLE 4.
INTERNATIONAL SPECIES INVENTORY SYSTEM
EXPENSES

January 1, 1974 - September 1, 1976^a

Salaries	\$ 20,044.74
Printing	21,095.89
Purchased Services	17,267.46
Computer Services	40,398.72
Communications ^b	5,187.62
Travel	4,618.82
Freight and Delivery	5.00
Other Contractual	356.25
Supplies	1,595.02
Equipment ^c	<u>1,134.55</u>
Total Expenditures	<u>\$111,704.07</u>

Total Receipts	<u>\$114,564.00</u>
Balance of Support Funds - September 1, 1976	<u>+\$ 2,859.93</u>

^aExpenses for the month of August are estimates.

^bDoes not include telephone, xeroxing and office space supplied by the Minnesota Zoological Garden.

^cOffice furnishings supplied by the Minnesota Zoological Garden.

TABLE 5.
INTERNATIONAL SPECIES INVENTORY SYSTEM
PROJECTED ANNUAL OPERATING COSTS

<u>BUDGET CATEGORY</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Salaries & Fringes			
Data Processor	\$ 9,200	9,600	10,000
Records Keeper	12,000	12,500	13,000
Clerk-Typist		9,600	10,000
Data Assembly, Printouts, Computer			
Time and Key punch Rental	12,000	15,000	20,000
Printing			
Data Forms, Cards, Correspondence	1,500	2,000	3,400
Telephone and Mailing Costs	2,500	2,500	3,500
Travel	2,500	2,500	2,500
Systems Analysis and Programming	1,500	1,000	1,500
Office Supplies	500	500	600
Equipment	500	200	400
Memberships and Subscriptions	<u>100</u>	<u>100</u>	<u>100</u>
TOTAL	<u>\$42,300</u>	<u>\$55,500</u>	<u>\$65,000</u>

TABLE 6.
 INTERNATIONAL SPECIES INVENTORY SYSTEM
 PROJECTED RECEIPTS - 1976

	<u>ANTICIPATED</u>	<u>RECEIVED TO DATE</u>

Participation Fees		
Mammals	24,000	18,055
Birds		
USDI	10,000	10,000
Special Reports	300	170
Other Grants, Gifts and Donations	<u>8,000</u>	<u> </u>
TOTAL	<u>\$42,300</u>	<u>\$28,225</u>

TABLE 7.
INTERNATIONAL SPECIES INVENTORY SYSTEM
REPTILE/AMPHIBIAN START-UP BUDGET

Taxonomy Directory Preparation	\$ 8,500.00
Collection of Literature	
Review, Assignment of Numbers and Editing	
Consultant Review	
Keypunching and Computer Input	5,500.00
Printing and Design	
Taxonomic Directories	4,800.00
Data Forms	3,000.00
Design (directory cover)	200.00
Systems Analysis and Programming	4,500.00
Mailing Expenses	<u>3,500.00</u>
	<u>\$30,000.00</u>

TABLE 8.
INTERNATIONAL SPECIES INVENTORY SYSTEM
FISH START-UP BUDGET - 1977

Taxonomy Directory Preparation	\$ 1,000.00
Collection of Literature	
Review, Assignment of Numbers and Editing	
Consultant Review	
Key punching and Computer Input	4,000.00
Printing and Design	
Taxonomic Directories	2,000.00
Data Forms	2,000.00
Design (directory cover)	200.00
Systems Analysis and Programming	3,500.00
Mailing Expenses	<u>2,300.00</u>
	<u>\$15,000.00</u>

TABLE 9.
 INTERNATIONAL SPECIES INVENTORY SYSTEM
 LIFE HISTORY DEVELOPMENT AND IMPLEMENTATION
 Two Years (1976-1977)

Systems Analysis and Programming	12,900.00
Clerk-Typist	2,000.00
Systems Manager (20% time)	6,000.00
Records Keeper (10%-20% time)	4,000.00
Keypunching and Computer Input	5,000.00
Data Assembly, Printouts and Computer Time	5,000.00
Design - Data Forms	100.00
Printing	
Instructions	500.00
Data Forms (10,000)	500.00
Annual Reports	1,000.00
Correspondence Expenses	<u>3,000.00</u>
	<u>\$40,000.00</u>

TABLE 10.
INTERNATIONAL SPECIES INVENTORY SYSTEM
COST ESTIMATES
PEDIGREE ANALYSIS SUBSYSTEM

PHASE I

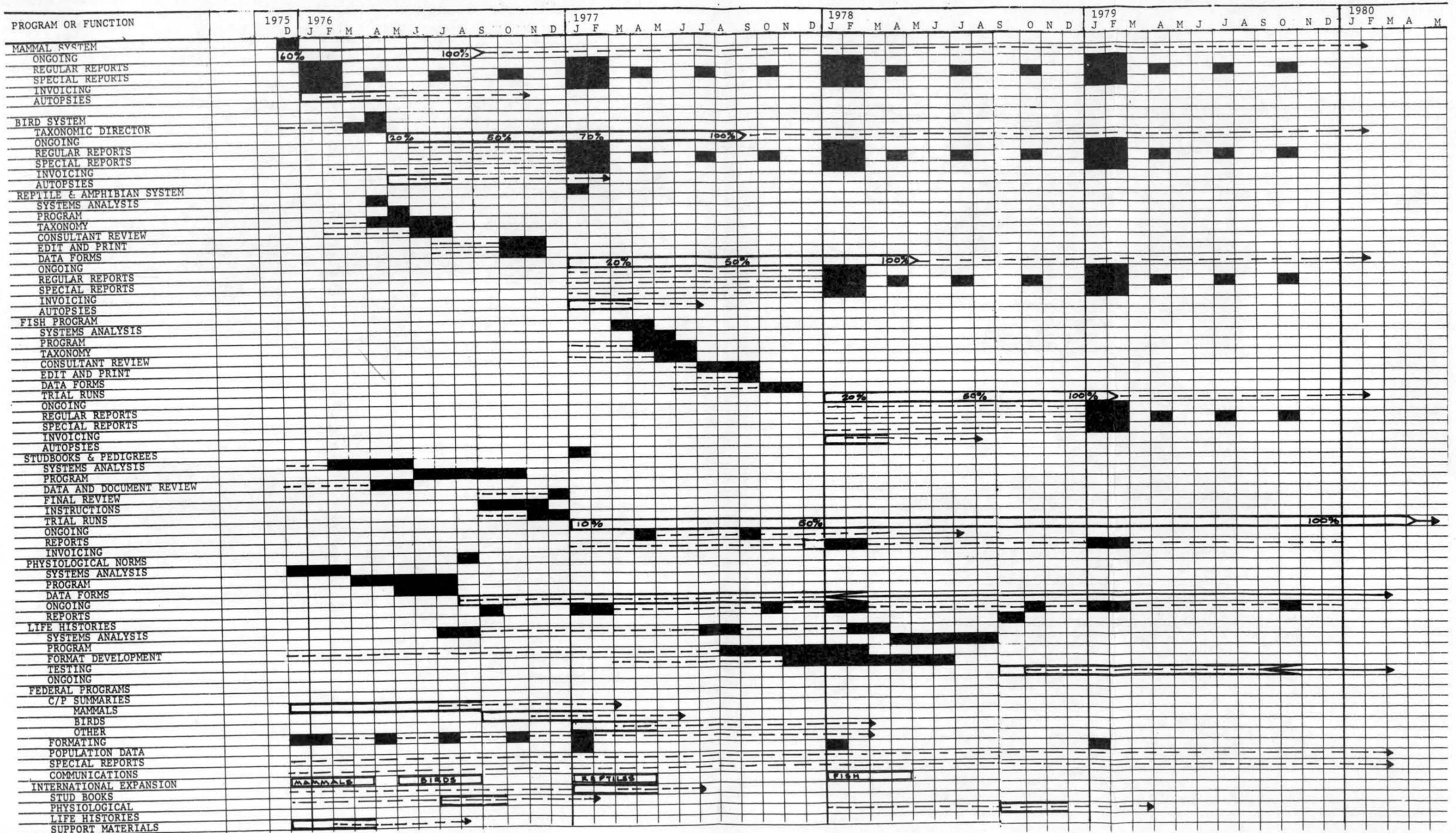
<u>Segment 1</u>			
120 hrs	Systems Analysis (\$13.75/hr)	\$1,650.00	
150 hrs	Programming (\$11.50/hr)	1,725.00	
	Computer and Equipment	<u>340.00</u>	3,715.00
 <u>Segment 2</u>			
50 hrs	Systems Analysis	\$ 687.00	
80 hrs	Programming	920.00	
	Computer and Equipment	<u>240.00</u>	1,847.00
 <u>Segment 3</u>			
180 hrs	Systems Analysis	\$2,475.00	
50 hrs	Programming	550.00	
	Computer and Equipment	<u>200.00</u>	3,225.00
 <u>Segment 4</u>			
40 hrs	Systems Analysis	\$ 500.00	
120 hrs	Programming	1,380.00	
	Computer and Equipment	<u>150.00</u>	2,030.00
 TOTAL PHASE I			<u>\$10,817.00</u>

PHASE II

<u>Segment 5</u>			
	Final Review, Correction and Program Revision (Phase 8 Program)	<u>3,000.00</u>	3,000.00
 <u>Segment 6</u>			
	Incorporation of Existing Studbook Data	<u>7,000.00</u>	7,000.00
 TOTAL PHASE II			<u>\$10,000.00</u>
 TOTAL PHASE I AND PHASE II			<u>\$20,817.00</u>

APPENDIX I.

INTERNATIONAL SPECIES INVENTORY SYSTEM
PROJECTED TACTICAL SCHEDULE
1976 - 1980



AAZPA ISIS COMMITTEE

MID-YEAR REPORT

20 JANUARY 1976

TO:

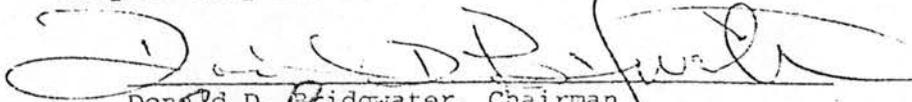
OFFICERS AND DIRECTORS
of the
AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS

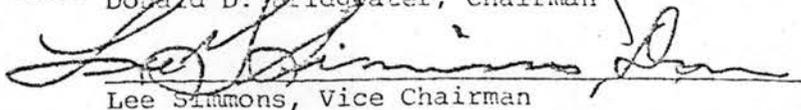
From:

DONALD D. BRIDGWATER, CHAIRMAN
DIRECTOR, MINNESOTA ZOOLOGICAL GARDEN
WEST SAINT PAUL, MINNESOTA 55118

HEREIN IS PRESENTED A SUMMARY OF ACTIVITIES,
SUPPORTING DATA AND RECOMMENDATIONS FOR ACTION
WITH RESPECT TO THE AAZPA ISIS COMMITTEE AND PROGRAM.

Respectfully Submitted:


Donald D. Bridgwater, Chairman


Lee Simmons, Vice Chairman

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I. INTRODUCTION

This report contains the status survey of the AAZPA ISIS committee, a description of budget, activities and recommendations as of 20 January, 1976.

II. CURRENT ORGANIZATION

A. Committee Structure

Following the AAZPA Conference, the AAZPA Computer Data Committee has been renamed AMERICAN ASSOCIATION OF ZOOLOGICAL PARKS AND AQUARIUMS INTERNATIONAL SPECIES INVENTORY SYSTEM.

The committee is now structured as follows:

General Operations and Planning

Donald D. Bridgwater, Chairman, St. Paul, Minnesota
Lee Simmons, D.V.M., Vice Chairman, Omaha, Nebraska
Clayton Freiheit, Denver, Colorado
John Mehrtens, Columbia, South Carolina
Peter Karsten, Calgary, Alberta, Canada
David Z. Zucconi, Tulsa, Oklahoma
U. S. Seal, PhD., Minneapolis, Minnesota
Paul N. Linger, Jr., Denver, Colorado

This committee is charged with the overall direction, evaluation, planning, and function of the ISIS Operations.

In addition by AAZPA action, two subcommittees have been established as follows:

Life Histories Subcommittee

Paul N. Linger, Jr., Chairman, Denver, Colorado
Hal Markowitz, Portland, Oregon
Judith Block, Washington, D.C.
Peter Covey, Omaha, Nebraska
Dave Banks, Calgary, Alberta, Canada
John Wortman, Topeka, Kansas

This subcommittee is charged with the development of a life histories data storage and retrieval system. Additional members and contributors are the responsibility of its chairman.

Planning and Development Subcommittee for Studbooks

Donald D. Bridgwater, Chairman, St. Paul, Minnesota
Alan Shoemaker, (Presidential Advisor on Studbooks)
Columbia, South Carolina
Charles Wilson, Little Rock, Arkansas
Judith Block, Washington, D.C.
Devra Kleiman, PhD., Washington, D.C.
Marvin Jones, San Diego, California
Saul Kitchener, San Francisco, California
Mark Rosenthal, Chicago, Illinois
Peter Covey, Omaha, Nebraska

This committee is charged with the development of an international studbook system and pedigree analysis system for incorporation in the ISIS format, the development of a worldwide studbooking system, the evaluation of current and proposed studbooks and recommendations for their operation as envisioned by the AAZPA Board when it declared the intent to establish such a group.

B. Staffing

Day to day operation of ISIS is the responsibility of Mrs. Linda Murtfeldt, Systems Manager, whose support comes from the Minnesota Zoological Garden as its Zoological Records Supervisor. Data processing, filing, and some clerical support are provided by Miss Kim Hastings, who is supported by the ISIS budget. Systems analysis, programming, and continuing evaluation is provided by Mr. Dale Makey on a consultant basis, supported by the ISIS budget.

C. Other Support Elements

General supervision, management of funds, activities, and operations is given by the general committee, but in the hands-on, day to day sense, is provided by the chairman, vice-chairman, and the systems originator, Dr. U. S. Seal. These activities are on a volunteer basis except for minimal travel expenses. Computer services are supplied by the State of Minnesota, Information Systems Division, and is paid for from ISIS budget. Preliminary work on studbook and pedigree analysis and data input is being provided under contract with Minnesota Zoological Garden by Dr. Nate Flesness, Department of Biochemistry, University of Minnesota, and by Marvin Jones, San Diego, California, under contract with ISIS. Additionally, Marvin Jones, through association with other institutions, particularly San Diego, Portland, Colorado Springs, and Basle, Switzerland, has supplied or will supply data for entry into the system.

In addition, numerous individuals and organizations continue to give advice, review programs and make recommendations as a volunteer service which could be afforded in no other way.

III. PROGRAM

A. General Statement

During November and December, an intensive review of ISIS was carried out covering a three year period, 1976 through 1978. Specifically, program and schedules were evaluated and established as shown in the tactical schedule (Appendix I). ISIS is now divided into nine specific functions as follows: 1) Mammals Inventory; 2) Birds Inventory; 3) Reptiles and Amphibians Inventory; 4) Fish Inventory; 5) Studbooks and Pedigrees; 6) Physiological Norms; 7) Life Histories; 8) Federal Programs; and 9) International Expansion. These functions generally consist of two major cost-time elements: start-up and ongoing operation. The entire program is well ahead of that original schedule and all systems are now on or ahead of schedule.

B. Program Description and Schedules

1. Mammals: The system is ongoing. Approximately 111 American institutions are participating, with data forms for over 27,000 of the projected 36,000 possible mammal entries for North America in the system (75% complete). The second annual zoo inventory, zoo acquisition and release, and species distribution reports will be mailed on February 2, 1976 to 111 participants, along with invoices. The system should achieve 100% completion by participating institutions by September 1976. This will also include autopsy information. Quarterly reports can be produced on demand. The budget is operational with no additional start-up costs.

2. Birds: Work on birds is nearing completion. Over 60 zoos are working on bird data forms. Remaining zoos will receive data forms shortly. The overall bird taxonomy is essentially complete and it is being printed in sections and sent to zoos. A series of trial runs have already been accomplished and the system is debugged. The bird segment of the system will become fully functional over the next four months.

Bird inventories for 12 zoos covering 500 entries will be mailed in February, 1976. It is anticipated that the data will be 50% complete by September, 1976, and 100% complete by September, 1977. Funds for final start-up are available and the budget is considered an operationa subscription supported element.

3. Reptiles and Amphibians: Systems Analysis will begin in February modeled along the lines of the mammal and bird system. Start-up costs will be similar to that for birds and funds are not now available. Provided funds, the entire program can be developed in 1976 and can be operational by January, 1977, and all data input complete by March, 1978. Ongoing operations would be supported by service fees.

4. Fish: The problem of dealing with a complete fish taxonomy dictionary is felt beyond the scope of any foreseeable need. For this group of vertebrates, a framework taxonomy is proposed which would be complete to the family level, but within families would consider only those genera and species on the Endangered Species List and certain species of recommended exhibit interest in this country. This framework would be flexible and would allow the addition of any additional species later recognized as either endangered or threatened. Included in this listing would be all species on the treaty list of the "Convention on International Trade in Endangered Species of Wild Fauna and Flora". It is proposed this project begin in 1977 after successful implementation of the reptile and amphibian segment of the project, with ongoing operations in January, 1978 and fully completed at year's end. There is currently no money for start-up costs available.

5. Studbook and Pedigree System: Preliminary work on this system has started and if funded could be developed, debugged and made operational by Spring, 1977. Its development and operation is the prime concern of the AAZPA's Planning and Development Subcommittee for Studbooks under AAZPA's ISIS Committee. There is currently no funding available for this project. A detailed report on plans and needs is given in Section IV of this report.

6. Physiological Norms: This project is being developed with the assistance of the American Association of Zoo Veterinarians (AAZV) and at least two private foundations. It will be a sub-program of ISIS, and the clinical and laboratory data will be linked to individual animal ISIS ID numbers. It will also be used to develop a set of statistical norms on a wide range of laboratory tests for use by veterinarians in their clinical care and management of animals in captivity. This program will further enhance our ability to evaluate the status of endangered species held in captivity, and more particularly, ascribe causes in greater detail to difficulties that might occur in these animals on an ongoing basis. We will, of course, collect not only normal data but data from animals being treated or examined for reasons of disease.

Systems Analysis for this program is complete (Appendix II) as are data forms. Already much data has been collected and the entire system will be operational by August, 1976. Current and anticipated start-up funds presently appear sufficient to cover the costs of this system. Further evaluation of this program is given in Appendix III to be published in the Journal of Zoo Animal Medicine.

7. Life Histories: This subcommittee program has been ongoing for some 18 months under the leadership of Paul Linger, in cooperation with ISIS staff and many zoo professionals. It is perhaps the most complex and time-consuming project being worked on by ISIS and detailed examination is in process by trial-run zoos. A trial data form has been developed (see Appendix IV).

It is designed to collect data on important life events including breeding, reproduction, diet, behavioral requirements, behavioral characteristics and veterinary clinical information on individual animals. The data again will be referenced to the ISIS ID number of individual animals. It will then be possible to collate it by species, as well as providing a very detailed segment of the life history of a given animal which can be tied to the clinical information, pedigree information, and any other kinds of information that are subsequently developed. It will provide the data base for diagnosing difficulties encountered in the course of management of captive populations. It will also provide a valuable data base which could be used for evaluation of species in their wild habitat and as a basis for developing management strategies and for identifying specific studies that might need to be undertaken in the field. Work has been under way on this system during the past year. It is our anticipation that approximately two additional years will be required for its development. The overall cost has not been established, but an initial analysis indicates that it will be in the neighborhood of \$40,000 (see Budget section).

8. Federal Programs: Recognition by the Federal Government that the AAZPA, with its ISIS programs, has developed a tool to demonstrate the value, effectiveness and position of zoos relative to the morass of legislation, emotional outcry, and misinformation currently facing institutions whose mission is to preserve, protect and educate through the vehicle of animals, has resulted in an increasing need to supply data and provide support and testimony. To this end, some support for ISIS has been supplied by the Department of the Interior, and an increasing amount of time has been devoted to these ends. It is expected that this activity will increase throughout the coming years. Further comment and recommendation appears in Section IV of this report.

9. International Expansion: Efforts to expand ISIS to include zoos on an international basis are being actively pursued and well received. Already supporting data and information exchange is taking place and it is anticipated that some international input can be accomplished for mammals and birds by the end of 1976 with reptiles and fish to follow.

Studbook data and information exchange is under way and it is anticipated that international studbook participation can be achieved concurrent with an ongoing program beginning in January, 1977.

ISIS was presented to the IUDZG in Colorado Springs in October, 1975. As a result several zoos gave tentative commitment to participate (see Participating Status section).

Regularly, communications of ISIS activities are being sent to the IUCN, Survival Service Commission, International Zoo Yearbook, World Wildlife Fund, International Zoo News, and selected institutional representatives throughout the world.

IV. CURRENT OPERATIONAL ACTIVITIES

A. Mammals

As described in Section III B above, data collection and report generation is proceeding.

B. Birds

As described in Section III B above, will be fully operational with continued data collection and first full annual report anticipated in January, 1977.

C. Reptiles, Amphibians, Fish

Will begin development of programs as previously described, as start-up funds become available. A grant-in-aid is being prepared to partially fund the development of these programs.

D. Physiological Norms

As described in Section III B above.

E. Life Histories

As described in Section III B above.

F. Studbook and Pedigree Analysis Sub-System

This activity has as its major objective the development of a pedigree output and analysis program which would allow detailed tracing of the history of an individual animal throughout its life and through transfer of ownership. It would also allow identification of parentage and offspring and their location and/or fates. Current or future studbooks and other historical information would be incorporated with the end result being the ability to generate a format allowing pedigree presentation, analysis and genetic analysis for any selected species. This information can then be used to develop broad range breeding programs through the use of unifying data and coordination.

A second objective is the universal unification and coordination of all studbook activity. ISIS would not and could not replace the need for individual studbookers but would provide a single permanent coordination base and a management tool for species survival. A tentative format for pedigree reports has been designed (Appendix V) and Dr. Nate Flesness is proceeding to contact studbookers to collect and evaluate available studbook data for inclusion.

Early theoretical work and the development of models from currently available data has been supported by the Minnesota Zoological Garden and is partially presented in Appendix VI, carried out by Dr. Nate Flesness. To further develop Systems Analysis and Programming during the coming year

will require \$10,867 as indicated in the accompanying cost estimate. This can be done by January, 1977. At that time an additional \$3,000 for final review, corrections and program revision would be needed.

At this time it is felt that all available studbook data could be incorporated into the system for an additional \$7,000 (see Budget section). Discussion of this program was also reviewed at the IUDZG.

Mr. Marvin Jones is currently placing his captive orang data into ISIS format and following original work by John Mehrtens, we have recommended to President Werler the approval of a transfer of the Orang Studbook to the San Diego Zoo for the Yerkes Laboratory to be kept by Marvin Jones. Mr. Bieler has committed funds for this activity. The Wildlife Conservation Committee, through the efforts of its Chairman, John Mehrtens, initiated this action and has recommended it as well. It is the committee's recommendation that the studbook should not remain at Yerkes. The committee wishes to point out that as a federally supported institution, data retention by Yerkes could not legally be done. During the next months the studbook subcommittee hopes to effect a complete evaluation of all existing and recorded studbooks leading toward a general recommendation for consideration by the AAZPA, IUDZG and International Zoo Year Book.

G. International Coordination

Extension of the ISIS data system outside the United States and Canada has begun as described in Section III B earlier. There is a pressing need to universalize and coordinate captive breeding efforts and programs; develop, disseminate and maintain studbooks, and perhaps most important, to develop effective recommendations, representation and assistance reflecting the zoological garden position to the proliferation of international organizations. The IUCN, through its worldwide organization, was designed to effect this; yet zoological garden representation has been intermittent. The Survival Service Commission has recognized the need to develop a method of representation reflecting zoos and aquariums which would be both effective and able to supply adequate numbers, logic and resources to reach effective recommendations. Toward this end, the International Union of Directors of Zoological Gardens, IUDZG, comprising 64 members, has been considered by some as the appropriate representative. This becomes a concern because of its limited membership, lack of accreditation and data sources. On the other hand, the American Association of Zoological Parks is the largest single professional group representing zoological gardens and aquariums and has representatives in 25 countries. There are also other groups such as International Zoo Yearbook which might qualify.

Some time ago, it was suggested by the Survival Service Commission that a zoo liaison group be established to create a representative voice

on an international basis reflecting membership from major zoological organizations. Recommendations for the management and action in regard to endangered animal species throughout the world, as well as recommendations in response to various and proliferating regulations in this regard are acutely needed. Curiously, for a long number of years, there has been established as a sub-group of the Survival Service Commission the Threatened Plant Group. This organization is headed by Dr. Haslop Harrison, Chairman of the Royal Botanical Gardens at Kew, and they have developed a program, headed by Dr. Granville Lucas, also of the Zoological Gardens of Kew, which program is exceedingly similar to the ISIS program. It is a computerized system reflecting and effecting an international set of data and management policies with regard to plant species. At the present time they estimate there are over 20,000 endangered plants in the world. Also at the present time, the Royal Botanical Gardens of Kew has nearly 80,000 specimens living in the garden. This multiplied by all the botanical gardens in existence gives them the potential with their system to be in the possible position to save through a variety of techniques and actions every species of endangered plants currently existing.

In view of this and the expressed needs of the Survival Service Commission, we believe the AAZPA ISIS program is in a unique position to assist in effecting such a zoo and aquarium group which would include representatives from IUDZG, AAZPA, International Zoo Yearbook, and perhaps others with a chairman appointed to coordinate and respond.

It is recommended that the AAZPA contact Sir Peter Scott, Chairman of the Survival Service Commission, immediately and recommend that AAZPA wishes to participate or assist in the development of such a zoo liaison group and further recommends that the chairman of the AAZPA ISIS committee be appointed as the AAZPA representative.

H. Federal Programs

In October, 1973, the AAZPA took action to endorse ISIS as an official function. At that time ISIS was charged with the development of a national program of a zoo animal data collection, storage, and retrieval system with the understanding that such data would be used to assist in our management of species and document the status of animals governed by Federal and State regulations.

ISIS has since worked toward that end. In September at the Calgary annual meeting, in presentations to the officers and directors of the AAZPA, Computer Data Committee, and an open AAZPA members meeting, detailed reports on the status of mammals in the United States and Canadian zoos was presented. One of the salient reports was that in a series of meetings with the Office of Endangered Species of the USDI, it was noted that proposed changes in the regulations would allow for the downgrading of any endangered species upon the demonstration that their captive popula-

tions, under the definition of the regulations, were captive self-sustaining populations (CSSP). Further, it was recommended at these meetings that such action be taken on the basis of data then available for five species including the tiger, jaguar, leopard, black lemur and ring-tailed lemur, and further that at the request of the USDI, ISIS would assist in the development of a reporting form to be used for exchanging such CSSP species among institutions receiving two-year permits covering such species, in accordance with the regulations published in the Federal Register, Vol. 40, No. 188, Friday, September 26, 1975, p. 44417. Based on verbal statements of approval by the AAZPA officers and directors, committee members and general members at these meetings, with no dissent, this action was taken on November 14, 1975 after discussions with AAZPA leadership, generally distributed to all appropriate parties on December 3, 1975, and published in the newsletter in January, 1976.

Only three negative responses have been received, one stating that this action will only fog the great hope of an amendment granting no controls to the holders of endangered species, and two concerned with the obviously precarious position of certain subspecies within the broad category and questioning the validity of the data for two species.

To date the status of this action is reported in the Chairman's memo and summary of December 3, 1975 (Appendix VII).

Additionally, a tentative transfer form has been developed (see Appendix IIX) and submitted to the USDI to maintain a records keeping system under the blanket CSSP permit. It would be printed in the NCR paper in triplicate to be partially filled out by the seller, keeping a copy and forwarding it to the buyer who would complete the form, retain a copy, and forward the third copy to the Office of Endangered Species of the United States Department of the Interior. These third copies would be periodically bundled and forwarded to ISIS.

Thus, the ISIS system would provide a continuous status summary for all such species from participating institutions. Those not covered by such a reporting system would have to meet additional records keeping requirements independent of the ISIS format.

Members of the ISIS Committee, including Dr. U. S. Seal and Dr. Lee Simmons, have given testimony and presented data in Washington, and it is felt at last, through the use of logic and numbers, demonstrated more clearly the real position of zoos in regard to endangered species legislation and our ability to achieve both self-regulation and responsibility. (See Appendix IX)

It is the committee's feeling that the ISIS program can answer the data needs and provide the means to provide efficiently those record keeping and data needs required to meet federal and state regulations and records and real management problems, including:

1. Determination of captive self-sustaining status both by legal definition and in real species management terms;
2. Provide pedigree analysis (studbook records) gene pool and breeding management programs;
3. Provide data to deal with the problem of surplus animals;
4. Create a physiological data base for diagnosis and treatment of physical problems;
5. Create a data base for behavioral management programs;
6. Extend information for use in the management of wild populations;
7. Demonstrate in positive terms the actual status of our animal programs to the community at large.

A continued effort is being made to support the downgrading of all qualified endangered species to CSSP status and the development of a permit system which would allow AAZPA-affiliated institutions to more freely exchange and/or sell between themselves such CSSP species. In addition, through cooperation with ISIS and the Wildlife Conservation Committee, we can demonstrate our own ability to manage responsibly our own resources which will hopefully provide greater freedom and minimum regulation.

V. PUBLICITY

The ISIS program has caught the eyes of the media throughout the United States presenting a positive image of zoos and their mission to literally millions of people at all levels.

Both AP and UPI have done wire service stories which have appeared throughout the country in such remote places as Dodge City, Kansas and Duluth, Minnesota.

Among the major newspapers throughout the country included were the New York Times, New York Post, Chicago Daily News, Village Voice, Chicago Tribune, Dallas Morning News, Montgomery Advertiser, Topeka Capitol Journal, and many others.

Magazines carrying special articles include Information Systems Magazine, Computer World, Data Processor, ASC Newsletter, Parade Magazine, Sky-Delta Airlines, National Wildlife Magazine, Biocharacterist, Think, Pet Age, as well as many specialized zoo publications.

Media interviews with NBC, Canadian Broadcasting, World News, AP, UPI, Local National Affiliates, and the Voice of America have been held.

There are pending articles in My Weekly Reader, Chicago Field Museum Magazine and Natural History.

In short, the program is having a dramatic effect with regard to the zoo's image.

VI. PARTICIPATION

A. North America

Currently 176 U.S. and Canadian institutions have signed agreements to participate in the ISIS program and received the necessary materials to proceed. The status of these participants is given in Table 1 and 2. Table 2 lists 65 institutions who have neither submitted data or paid under the voluntary system established by the AAZPA at its annual meeting in 1974. Table 1 lists 111 institutions who have either submitted data or completed mammalian inventory data. Of these, 75 have fully completed mammalian inventories. Only 60 have paid under the voluntary system (approximately 54%). The program had anticipated 75% support under the voluntary system and another billing has been sent in the hope of additional support.

With a few notable exceptions, major zoological institutions are participating. Only the Okanagan Game Farm, Penticton, B.C., Rider Animal Company, Fort Clark Zoo Farm, Knowland Park Zoo, and Overton Park Zoo and Aquarium, Nashville, have indicated their wish to withdraw.

B. International

As a result of the presentation at the IUDZ meeting and in followup meetings, it appears fairly certain that the zoos in Caracas, Rotterdam, Antwerp, Copenhagen, Edinburg, Basle, and the Canal Zone will be joining the system and basic materials have been forwarded. Also Hanover, Leipzig and East Berlin have expressed strong interest in participating.

TABLE 1.

ISIS - ACTIVE PARTICIPANTS

*

1	2	3	4	
•				Abilene Zoological Gardens, Abilene, Texas
	•	•	•	Akron Children's Zoo, Akron, Ohio
•				Arizona - Sonora Desert Museum, Tucson, Arizona
•		•		Assiniboine Park Zoo, Winnipeg, Manitoba, Canada
•				Atlanta Zoological Park, Atlanta, Georgia
•				Audubon Park, New Orleans, Louisiana
•		•		Baltimore Zoo, Baltimore, Maryland
•		•	•	Beardsley Zoological Gardens, Bridgeport, Connecticut
•		•	•	Birmingham Zoo, Birmingham, Alabama
	•	•	•	Boston Zoological Society, Dorchester, Massachusetts (3 zoos)
•		•	•	Buffalo Zoological Gardens, Buffalo, New York
•		•		Burnet Park Zoo, Syracuse, New York
•		•	•	Busch Gardens, L.A., Van Nuys, California
	•	•		Buttonwood Zoo, New Bedford, Massachusetts
	•	•	•	Caldwell Children's Zoo, Tyler, Texas
•		•	•	Calgary Zoo and Natural History Park, Calgary, Alberta, Canada
	•	•		Gen-Tex Zoo, Waco, Texas
•		•		Chicago Zoological Park, Brookfield, Illinois
•		•		Zoological Society of Cincinnati, Cincinnati, Ohio
•		•	•	Cleveland Aquarium, Cleveland, Ohio
	•	•		Cleveland Zoological Park, Cleveland, Ohio
	•	•	•	Cohanzick Zoo, Bridgeton, New Jersey
•		•		Cole Park Zoo, Midland, Texas
•		•	•	Columbia Zoological Park, Columbia, South Carolina
	•	•		Columbus Zoological Gardens, Powell, Ohio
	•	•		Crandon Park Zoological Garden, Key Biscayne, Florida
	•	•	•	Dallas Zoo, Dallas, Texas
	•	•	•	Denver Zoological Gardens, Denver, Colorado
•		•	•	Dickerson Park Zoo, Springfield, Missouri
	•	•		Dreher Park Zoological Gardens, West Palm Beach, Florida
	•	•	•	Duke University Primate Facility, Durham, North Carolina
	•	•		Duluth Zoo, Duluth, Minnesota
	•	•	•	Ellen Trout Park Zoo, Lufkin, Texas
	•	•	•	Elmwood Park Zoo, Norristown, Pennsylvania
•		•	•	El Paso Zoological Park, El Paso, Texas
•		•	•	Erie Zoo, Erie, Pennsylvania
	•	•	•	Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
	•	•	•	Fort Worth Zoological Park, Fort Worth, Texas
•		•	•	Gladys Porter Zoo, Brownsville, Texas
•		•	•	Glen Oak Zoo, Peoria, Illinois
	•	•	•	Great Plains Zoo, Sioux Falls, South Dakota
	•	•	•	The Greater Baton Rouge Zoo, Baton Rouge, Louisiana
•		•	•	Henry Doorly Zoo, Omaha, Nebraska
	•	•		Henry Vilas Park Zoo, Madison, Wisconsin
•		•		Highland Park Zoo, Highland Park, Pittsburgh, Pennsylvania

*

1	2	3	4	
	•	•		Hogle Zoological Garden, Salt Lake City, Utah
	•	•	•	Houston Zoological Gardens, Houston, Texas
•		•	•	Jackson Zoological Park, Jackson, Mississippi
	•	•	•	Jacksonville Zoological Park and Society, Jacksonville, Florida
•		•	•	Jardin Zoologique de Quebec, Quebec, Canada
•		•	•	Kemper Zoological Park, Hattiesburg, Mississippi
•		•	•	Kansas City Zoological Gardens, Kansas City, Missouri
	•	•	•	Knowland Park Zoo, Oakland, California
	•	•		Knoxville Zoological Park, Knoxville, Tennessee
•		•	•	Lafayette Zoological Park, Norfolk, Virginia
	•			Las Vegas Valley Zoo, Las Vegas, Nevada
	•	•		Lee Richardson Zoo, Garden City, Kansas
•		•	•	Lincoln Children's Zoo, Lincoln, Nebraska
	•	•	•	Lincoln Municipal Zoo, Lincoln, Nebraska
	•	•	•	Lincoln Park Zoo, Chicago, Illinois
•		•	•	Los Angeles Zoo, Los Angeles, California
•		•	•	Marriott's Great America, Gurnee, Illinois
•		•	•	Mesker Park Zoo, Evansville, Indiana
•		•	•	Miller Park Zoo, Bloomington, Illinois
	•	•	•	Milwaukee County Zoo, Milwaukee, Wisconsin
•		•	•	Minnesota Zoological Garden, St. Paul, Minnesota
•		•	•	Montgomery Zoo, Montgomery, Alabama
•				National Marine Fisheries Service Aquarium, Woods Hole, Mass.
•		•	•	National Zoological Park, Washington, D.C.
	•	•	•	Natural Science Center and Zoo, Inc., Greensboro, North Carolina
•		•	•	New York Zoological Society, Bronx, New York
•		•	•	North American Predatory Animal Center, Doyle, California
	•	•	•	North American Wildlife Park Foundation, Inc., Battle Ground, Indiana
	•	•	•	Oklahoma City Zoo, Oklahoma City, Oklahoma
	•	•		Opryland, U.S.A., Nashville, Tennessee
	•	•	•	Overton Park Zoo and Aquarium, Memphis, Tennessee
•		•	•	Philadelphia Zoological Garden, Philadelphia, Pennsylvania
•		•	•	The Phoenix Zoo, Phoenix, Arizona
•		•	•	Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
	•	•	•	Portland Zoological Gardens, Portland, Oregon
	•	•	•	Ralph Mitchell Zoo, Independence, Kansas
•		•	•	Randolph Park Zoo, Tucson, Arizona
•		•		Rio Grande Zoo, Albuquerque, New Mexico
•				Roeding Park Zoo, Fresno, California
	•	•	•	Roger Williams Zoo, Providence, Rhode Island
•		•		Roosevelt Park Zoo, Minot, North Dakota
	•	•		T. Rowell, Primate Research, Univ. of Calif., Berkeley, California
•		•	•	St. Louis Zoological Park, St. Louis, Missouri
•		•	•	St. Paul's Como Zoo, St. Paul, Minnesota
•		•	•	The Salisbury Zoo, Salisbury, Maryland
•		•		San Antonio Zoological Gardens, San Antonio, Texas
•		•	•	San Diego Wild Animal Park, San Diego, California

*

1	2	3	4	
•		•		San Diego Zoological Garden, San Diego, California
	•	•		San Francisco Zoo, San Francisco, California
•		•	•	Santa Barbara Zoological Gardens, Santa Barbara, California
•		•	•	Santa Fe Community College Teaching Zoo, Gainesville, Florida
	•	•	•	Sedgwick County Zoo, Wichita, Kansas
	•	•	•	Seneca Park Zoo, Rochester, New York
	•	•	•	John G. Shedd Aquarium, Chicago, Illinois
	•	•		South Bend Zoo (Potawatomi Park), South Bend, Indiana
	•	•		Southwest Zoological Gardens, Mangum, Oklahoma
•		•	•	Topeka Zoological Park, Topeka, Kansas
•		•	•	Metro Toronto Zoo, West Hill, Ontario
	•	•	•	Trailside Museums, Bear Mountain, New York
•		•	•	Tulsa Zoo, Tulsa, Oklahoma
•		•	•	Turtle Back Zoo, West Orange, New Jersey
	•	•	•	Utica Zoo, Utica, New York
	•	•		Warner Bros. Jungle Habitat, West Milford, New Jersey
•		•	•	Wild Canid Survival and Research Center, St. Louis, Missouri
	•	•	•	Woodland Park Zoological Gardens, Seattle, Washington
	•	•		World Wildlife Safari, Winston, Oregon

- * 1. Paid on Voluntary Basis
 2. Not Paid on Voluntary Basis
 3. Mammal Data Partially Complete
 4. Mammal Data Complete

TABLE 2.

ISIS - INACTIVE PARTICIPANT LIST

African Lion Safari, Ferndale, Michigan
 African Lion Safari, Rockton, Ontario, Canada
 Alabama-Coachatta Indian Reservation, Livingston, Texas
 Alexander Lindsay Junior Museum, Walnut Creek, California
 Amarillo Zoological Society, Amarillo, Texas
 Amigita Grande Ranch, Houston, Texas
 Aqua Circus - Aquarium of Cape Cod, West Yarmouth, Massachusetts
 Bear Country, U.S.A., Rapid City, South Dakota
 Big Bell Ranch, Eads, Tennessee
 Boise City Zoo, Boise, Idaho
 Brookgreen Gardens, Murrells Inlet, South Carolina
 Warren E. Buck, Glendora, New Jersey
 Catoctin Mountain Zoological Park, Thurmont, Maryland
 Cedar Bluff Aquarium, Ellis, Kansas
 Cheyenne Mountain Zoo, Colorado Springs, Colorado
 Conservatory - Aviary, West Pittsburgh, Pennsylvania
 Dakota Zoological Society Inc., Bismarck, North Dakota
 Detroit Zoological Park, Royal Oak, Michigan
 Endangered Wildlife Research Program, Patuxent Center, Laurel, Md.
 Forest Park Zoo, Springfield, Massachusetts
 Fort Clark Zoo Farm, Brackettville, Texas
 Gilbert, Mr. & Mrs. Frank H., Phoenix, Arizona
 Granby Zoological Society, Granby, Quebec, Canada
 Indianapolis Zoological Society, Inc., Indianapolis, Indiana
 Inland Empire Zoo, Spokane, Washington
 Jungle Larry's African Safari, Naples, Florida
 Little Rock Zoo, Little Rock, Arkansas
 Living Desert Reserve, Palm Desert, California
 Long Island Game Farm, Inc., Manorville, New York
 Louisville Zoological Garden, Louisville, Kentucky
 Lummis Livestock Co., Cheyenne, Wyoming
 Marineland of the Pacific, Rancho Palos Verdes, California
 Miami Seaquarium, Miami, Florida
 Mystic Marinelife Aquarium, Mystic, Connecticut
 National Aquarium, Washington, D.C.
 New England Aquarium, Boston, Massachusetts
 North Carolina Zoological Park, Asheboro, North Carolina
 Okanagan Game Farm, Penticton, British Columbia
 Olympic Game Farm, Sequim, Washington
 Oxbow Park Zoo, Rochester, Minnesota
 Parque Zoologico Nacional, Santo Domingo, Dominican Republic
 Racine Zoological Park, Racine, Wisconsin
 Rancho Gango Musk Ox Farm, Hughenden, Alberta, Canada
 Research Ranch, Elgin, Arizona
 Rock Island Co. Niabi Zoological Preserve, Moline, Illinois
 Ross Park Zoo, Binghamton, New York

Sacramento Zoo, Sacramento, California
Safari Animal Country, Inc., Northumberland, New York
Scripps Aquarium, La Jolla, California
Sea Life Park, Waimanalo, Hawaii
The Seattle Aquarium, Seattle, Washington
Snyder's Darien Lake Zoo, Corfu, New York
Spring Creek Animal Farm, Elko, Nevada
Stanislaus Zoological Society, Modesto, California
Staten Island Zoo, Staten Island, New York
Storyland Valley Zoo, Edmonton, Alberta, Canada
Sunset Zoo, Manhattan, Kansas
Terry Lou Zoo, Scotch Plains, New Jersey
Toledo Zoological Gardens, Toledo, Ohio
Vancouver Public Aquarium, Vancouver, British Columbia
Ven-Am Research Center, Cache, Oklahoma
Vollrath Park Zoo, Sheboygan, Wisconsin
Walt Disney World, Lake Buena Vista, Florida
The Wildlife Preserve, Largo, Maryland
Zoo St. Felicien, St. Felicien, Quebec, Canada

VII. BUDGETS

During the past month, a detailed analysis of budgetary needs was carried out in relation to the tactical program schedule (Appendix I). This analysis has resulted in the division of costs into two categories: 1) ongoing operational costs, and 2) new program and start-up costs. Table 5 indicates basic operational cost estimates over the next three years and assumes that concurrent new program monies will provide for the orderly development of new programs as indicated in the tactical schedule. The budget principle here is to create a situation where shared user fees or grants by those individuals, institutions or agencies using the system will equal the basic operational costs.

Funds for the start-up of mammals and birds have been achieved.

Tables 6, 7, 8 and 9 indicate costs for start-up of reptiles and amphibians, fish, studbook and pedigree analysis and life histories. In addition, start-up costs for physiological norms are being sponsored by the AAZV and several supporting foundations in the amount of \$22,000.

A. Current Budget Statement

The current budget is presented in two parts covering January 1, 1974, generally considered to be the starting date of ISIS, through January 20, 1976.

Table 3 indicates total receipts. No attempt is made to account for the hundreds of volunteer hours and support expenses provided by various individuals and institutions, so these numbers reflect only actual funds received or expended specifically for the ISIS program. \$84,916 has been received.

In Table 4, expenses have been categorized and total \$82,817, leaving a current balance on hand of \$2,099 for continued operations.

Referring to Table 5, the ISIS Projected Annual Operating Cost, covering 1976, 1977 and 1978, we estimate an operating budget need for the next year of \$40,000. This money must be generated through the payment for services by participating institutions and it is imperative that response to the billings sent out in February along with the first reports be honored in accordance with the AAZPA action to make such payments mandatory beginning July 1, 1975.

We hope that a large number of institutions currently on the inactive list will begin to participate. Further, on the basis of the program's meaningfulness and success, the committee makes the recommendation to the AAZPA described later in the Recommendation section that action be taken to make participation in the ISIS program a mandatory requirement for those institutions belonging or wishing to belong to the AAZPA and as a condition for national accreditation.

B. Proposed Operational Budgets

Referring to Table 5, we have projected basic operating costs through the next three years as follows: 1976-\$40,000; 1977-\$55,100;¹ 1978-\$70,000.

Other than reflected increases for increased data handling, mailing and communications, there will be the need for a full time clerk typist beginning this year, and in 1977, a full time records keeper.

Thus, in 1978, with all programs discussed in this report operational, ISIS would consist of three support staff members full time, with management accomplished on a voluntary basis. Currently there are two full time positions, one of which is supported by the Minnesota Zoological Garden. By 1978, our own records keeping will demand this person full time and ISIS must assume responsibility.

C. Proposed Program for Budgets

Table 6 indicates preliminary budget and start-up costs for the reptile and amphibian system, to be accomplished in 1976.

Table 7 indicates budget and start-up costs for fish.

Table 8 indicates budget and start-up costs for the life history development system.

Table 9 indicates cost estimates for the ISIS studbook and analysis system. This system is perhaps the most crucial currently being considered and is divided into six segments. It will take approximately one year to accomplish segments one through four beginning immediately. We are requesting that the AAZPA underwrite the cost of complete systems analysis and programming covering segments one through four in the amount of \$10,867. Segment five funds will be needed in January 1977 in the amount of \$3,000 for final review, corrections and program revision, generally referred to as phase eight program. Segment six, in the amount of \$7,000 would then be required to incorporate all existing studbook data, including, perhaps, certain new studbooks into the ISIS system.

In summary, current and potential income appears sufficient to maintain the ISIS operation. Additional grant funds must be sought and are currently being sought from various foundations, individuals and agencies for reptiles and amphibians, fish, life histories, and through the AAZPA studbooks and pedigree analysis subsystem. Success in these areas is imperative if ISIS is to proceed in an orderly manner.

¹ This budget could be low in the printing and distribution section if international expansion proceeds quickly.

TABLE 3.

INTERNATIONAL SPECIES INVENTORY SYSTEM

EXPENSES

January 1, 1974 - January 20, 1976

Salaries	\$ 7,629.00
Printing	19,319.10
Part-time Support	15,185.46
Purchased Services	91.55
Computer Services	30,771.65
Communications ^a	2,966.63
Travel ^b	3,519.22
Freight and Delivery	5.00
Other Contractual	240.00
Supplies	1,056.14
Equipment ^c	1,133.55
Total Expenditures	<u>\$ 82,817.30</u>
Total Receipts	<u>\$ 84,916.00</u>
Balance of Support Funds - January 20, 1976	<u>+ \$ 2,099.00</u>

^a Does not include telephone, xeroxing and office space supplied by Minnesota Zoological Garden.

^b ISIS Related Travel: September 1974 AAZPA Conference, Philadelphia, (Seal); November 1974 AAZV Conference, Atlanta (Seal); May 1975 Wolf Symposium, Wilmington, No. Carolina (Murtfeldt); April-May 1975 AAZPA Regional Conference, Louisville, Knoxville, Omaha, Newark (Seal) paid for by other sources.

^c Office furnishings supplied by Minnesota Zoological Garden.

TABLE 4.

INTERNATIONAL SPECIES INVENTORY SYSTEM

RECEIPTS

January 1974 - January 1976

AAZPA 1973	\$ 2,500.00
Earl C. Sams Foundation, Inc.	10,000.00
Frankel Foundation	3,500.00 5,000.00
AAZV 1973	1,000.00
USDI 1974-75	10,000.00
USDI 1975	20,000.00
AAZPA 1974	10,000.00
AAZV 1974	3,500.00
Frankel Foundation (For Physiological Norms)	5,000.00
Zoo Participation Fees (60 Zoos)	13,796.00
Fees for Extra ISIS Directories	620.00
	<u>\$ 84,916.00</u>

Receipts to Date	\$ 84,916.00
Less Expenses to Date	82,817.00
Net Operating Funds	<u>\$ 2,099.00</u>

TABLE 5.

INTERNATIONAL SPECIES INVENTORY SYSTEM

PROJECTED ANNUAL OPERATING COST

<u>Budget Category</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Data Processor	\$ 9,100	\$ 9,100	\$10,000
Clerk-Typist	8,000	10,000	10,000
Records Keeper		12,000	12,000
Data Assembly, Printouts and Computer Time	6,000	8,000	12,000
Printing for Distribution of Inventories and Tabulations	5,000	5,600	15,000
Printing of Forms, Cards and Correspondence	700	2,000	2,000
Tapes	700	700	700
Telephone and Mailing Costs	2,000	2,000	3,000
Travel	2,500	2,500	2,000
Keypunch Rental (\$190/month)	3,400	2,300	2,300
Operating Supplies	2,500		
Office		300	300
Other		500	600
Memberships and Subscriptions	100	100	100
Total	<u>\$40,000</u>	<u>\$55,100</u>	<u>\$70,000</u>

TABLE 6.

ISIS
REPTILE/AMPHIBIAN
Start-Up Budget

Taxonomy Directory Preparation Collection of Literature Review, Assignment Of Numbers, Editing and Consultant Review	\$ 8,500.00
Keypunching and Computer Input	5,500.00
Printing and Design	
Taxonomic Directories	4,800.00
Data Forms	3,000.00
Design (directory cover)	200.00
Systems Analysis and Programming	4,500.00
Mailing Expenses	3,500.00
	<hr/>
	\$ 30,000.00
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TABLE 7.

ISIS
FISH
START-UP BUDGET
1977

Taxonomy Directory Preparation Collection of Literature Review, Assignment of Numbers and Editing and Consultant Review	\$6,000.00
Keypunching and Computer Input	4,000.00
Printing and Design	
Taxonomic Directories	2,000.00
Data Forms	2,000.00
Design (directory cover)	200.00
Systems Analysis and Programming	3,500.00
Mailing Expenses	2,300.00
	<hr/>
	\$ 20,000.00
	<hr/> <hr/>

TABLE 8.

ISIS
LIFE HISTORY DEVELOPMENT AND IMPLEMENTATION
Two Years
1976-1977

Systems analysis and programming	\$12,900.00
Clerk-Typist	2,000.00
Systems Manager (20% time)	6,000.00
Records Keeper (10%-20% time)	4,000.00
Keypunching and Computer Input	5,000.00
Data Assembly, Printouts and Computer Time	5,000.00
Design - Data Forms	100.00
Printing	
Instructions	500.00
Data Forms (10,000)	500.00
Annual Reports	1,000.00
Correspondence Expenses	3,000.00
	\$ 40,000.00
	\$ 40,000.00

TABLE 9.

COST ESTIMATES

ISIS Pedigree Analysis Subsystem

<u>Segment 1</u>		
120 hrs Systems Analysis (\$13,75/hr)	\$1,650.00	
150 hrs Programming (\$11.50/hr)	1,725.00	
Computer & Equipment	<u>340.00</u>	\$3,715.00
<u>Segment 2</u>		
50 hrs Systems Analysis	\$ 687.00	
80 hrs Programming	920.00	
Computer & Equipment	<u>240.00</u>	\$1,847.00
<u>Segment 3</u>		
180 hrs Systems Analysis	\$2,475.00	
50 hrs Programming	550.00	
Computer & Equipment	<u>200.00</u>	\$3,225.00
<u>Segment 4</u>		
40 hrs Systems Analysis	\$ 500.00	
120 hrs Programming	1,380.00	
Computer & Equipment	<u>150.00</u>	\$2,080.00
<u>Segment 5</u>		
Final Review, Correction and Program Revision (Phase 8 Program)	<u>\$3,000.00</u>	\$3,000.00
<u>Segment 6</u>		
Incorporation of Existing Studbook Data	<u>\$7,000.00</u>	<u>\$7,000.00</u>
		<u>\$20,867.00</u>

VIII. RECOMMENDATIONS

Upon consideration of the content of this Report, the American Association of Zoological Parks and Aquariums ISIS Committee respectfully requests the following recommendations be approved by the officers and directors of the American Association of Zoological Parks and Aquariums at its mid-year meeting, February 1976:

1. In view of the obvious success of the ISIS program with regard to the collection, dissemination of data, the ability to supply positive data needs with regard to federal regulations, and in consideration of positive image which the system has created and contributed with respect to the zoological garden and aquarium profession, and in consideration for the need of current and future firm guaranteed financing and support, we recommend that membership and participation in the ISIS program be a mandatory requirement for institutions belonging to the AAZPA or wishing to join the AAZPA. In addition, with reference to accreditation evaluation, it is recommended that the institutions' participation in the ISIS program be considered as a factor in making such evaluation.

2. It is recommended that support for the development of the pedigree analysis subsystem and studbooks through phase 4 be supported by the American Association of Zoological Parks and Aquariums and funds in the amount of \$10,867 be transferred to cover these costs during the year 1976.

3. It is recommended that, in view of the IUCN's Survival Service Commission group's intent to establish a zoo liaison group to represent the zoo and aquarium fields and the fact that a Survival Service Commission subgroup for plants is already in existence, the Threatened Plant Group, which has developed and is operating in a similar way to ISIS but with international standing, that the AAZPA Board move immediately to contact Sir Peter Scott, Chairman of the Survival Service Commission, recommending that the Chairman of the AAZPA ISIS Committee be appointed as the AAZPA representative member of such a zoo liaison committee, along with other appointments as they so consider to develop a working zoo liaison group representing the zoo and aquarium field at international levels.

4. It is recommended that continued summation of data with respect to the downgrading of endangered species as captive self-sustaining populations be continued with the definition understood as per the definition of federal regulations and not as per what the functional biologist would consider necessary to insure the survival of the population with respect to sufficient gene pool survivability data.

5. It is recommended that the AAZPA Board accept the tactical program schedule as is presented in this report.

6. It is recommended that the AAZPA Board approve the tentative budget projections with provision of annual and semi-annual review as the needs and data become more clearly defined.

7. That the AAZPA Board firmly recommend that the Orangutan studbook be placed in San Diego with the understanding of support by that institution, and that Marvin Jones be appointed to effect data transfer and creation of the studbook in San Diego.

APPENDIX I

APPENDIX II



NAME: ISIS - Veterinary Record

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PREPARED BY

Dale G. Maken

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SUBSYSTEM STUDY AND EVALUATION REPORT

VETERINARY RECORDS

Table of Contents

Introductory Letter

Project Scope

Information Requirements

General
Specific

Subsystem Approach

Project Evaluation

Rationale for Development
Project Staffing
Project Estimate
Project Schedule

Approvals:

D. Bridgwater

U. S. Seal

G. Kieffer

R. Atkinson

N. Bohn

R. Kelly

J. Schwartz



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INTRODUCTORY LETTER

TO; Donald Bridgwater, MZG
U. S. Seal, V.A. Hospital
Linda Murtfeldt, MZG

G. Kieffer, ISD
R. Atkinson, ISD
N. Bohn, ISD
R. Kelly, ISD
J. Schwartz, ISD
J. Lennon, ISD

FROM: Dale Makey, Consultant, Minnesota Zoological Garden

The review meeting of the information requirements and subsystems approach for the ISIS - Veterinary Record Sybsystem will be held on Wednesday, January 28, 1976 in the ISD Conference Room C at 1:00 p.m. The purpose of this review is to approve, disapprove or request further revisions to this study and evaluation. If any details of this report are not clear, please contact me at 725-6767 x6581.



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PROJECT SCOPE

The development of an ISIS - Veterinary Record subsystem as a supplement to the ISIS - Vital Statistics subsystem represents the second step in the development of a complete animal care system. The ISIS - Veterinary Record will be composed of information such as disease diagnosis, disease treatment procedures, detailed autopsy results, physiological norms, surgical procedures and other elective procedures. Due to funding limitations, the current development will be limited to the Physiological Norms segment. However, during the development of the Physiological Norms segment, attention will be given to the other segments of the subsystem so problems will be minimal during the development of those segments.

The Physiological Norms will be based on the SEAMAK system developed on a CDC 3300 computer by D. G. Makey and U. S. Seal at the Minneapolis V.A. Hospital. That system has provided useful physiological norms to the zoo veterinarians for the last several years. Those experiences have indicated which laboratory assays are useful for disease diagnosis and other parameters which are necessary for the maintenance of captive animal populations. The development of the Physiological Norms segment of the ISIS - Veterinary Record subsystem will be concerned with three report generations:

1. Physiological Records Survey - This survey will count and categorize the number of records in the file by animal type and disease state. The results of this report will allow the ISIS Systems Manager to evaluate the data base prior to a report request described in item 2 below.
2. Physiological Norms Summary - This report will be generated in response to a request which will identify the type of animal and the disease state of that animal. This report will contain means and standard errors of the laboratory test values summarized from all records from all participating zoos. The report will be used by veterinarians for disease diagnostic procedures.
3. Institution Veterinary Records - This report will provide physiological information about the specimens in each institution. In the cases where greater than 10 animals have been sampled within a zoo, the means and standard errors for this group will be determined. The report will be used by each veterinarian to provide a detailed physiological data history on each animal in the zoo.

The programs to be developed in the following phases will be written in either COBOL or FORTRAN depending on the application. FORTRAN programs will be required for the calculation of means and standard errors for the reports type 2 and 3 described above. However, COBOL programs will be required for data input editing, file manipulation and report generation.



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INFORMATION REQUIREMENTS

General Requirements

The main function of the project defined in this report is the generation of physiological norms summaries for the use in disease diagnosis in the zoo animals. These summaries will be produced on a demand basis after periodic analysis of the physiological data base. This procedure is necessary since if too few test values are used to compute the means and standard errors, the results can be biased considerably. The two secondary requirements of the system are to provide the zoos with the accumulation of physiological data from their own animals and to provide expansion capabilities to eventually encompass the total ISIS - Veterinary Record subsystem.

A central requirement for the ISIS - Veterinary Record subsystem is a classification system for the various disease states and surgical procedures used by veterinarians. The coding system which will be used is the "Standard Nomenclature of Veterinary Diseases and Operations" produced by the U. S. Department of Health, Education and Welfare.

Special Requirements

A. Physiological Records Survey

This report will survey all physiological data records in the ISIS file. The report will list each animal type which has physiological records available and the number of normal or disease state records for each animal and type. This report will be used by the ISIS Systems Manager to determine which animals and associated disease state qualify for the generation of physiological norms. This report will then list the numbers of physiological records by institution, subclassifying the records by animal and disease state within each institution.

B. Physiological Norms Summary

1. Laboratory Tests - 50 laboratory tests will be used in the summary procedure.
2. Summary Methods
 - a. Means, standard errors and the number of test values used will be made available for each laboratory test.
 - b. If the number of values for each test is less than 10, the values used for the summary will be printed on the report.
 - c. When the number of values used in the summary exceeds 10, the printing of these values will be controlled by user request parameters.
 - d. Listings of these test values will be in a columnar fashion for easy human scanning procedures.



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3. Animal related parameters which control the summary groups. These will be user specified.

- a. Summarize overall animal records.
- b. Summarize over each sex independently.
- c. Summarize by immobilization type independently.
- d. Summarize by age categories defined by request parameters.

C. Institution Veterinary Record

This report will provide the zoo veterinarians with a physiological history of the animals in their care. In addition to the physiological data, other vital statistics data will be extracted from the data already accumulated by ISIS. The support data will include age, tag or tattoo numbers, house names and etc. which will properly identify the animal. Additionally, the report will contain summaries of the physiological test values for an animal type when the number of individuals sampled exceeds ten. These summaries will contain means, standard errors and the number of test values used for each laboratory test.

D. Expansion Capabilities

As indicated earlier, in this study the segment being discussed here only one of five categories which will eventually be implemented into the ISIS - Veterinary Record subsystem. The five categories are:

1. Physiological Data Collection,
2. Autopsy Results,
3. Disease Diagnosis and Treatment,
4. Surgical Procedures, and
5. Elective Procedures.

Thus, when all these categories are developed a complete medical records system for the animals will be available.



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SUBSYSTEM APPROACH

General Approach

The general approach will be the direct integration of the ISIS - Veterinary Records subsystem into the ISIS system. This approach is necessary since the existing taxonomic list, institution list and inventory data file are required for editing of physiological data records and the generation of reports associated with the new subsystem.

Prior to the beginning of the programming for this subsystem, a Phase 8 will be performed on the ISIS - Vital Statistics subsystem. It is requested that the same ISD programmer be assigned to both the Phase 8 and this new subsystem. This Phase 8 experience should radically improve the efficiency of the programmer in the development of the Vet Edit/ Input subsystem (SS-20) describe below.

Specific Approach

A. Files

1. Existing files

- taxonomic list file (single entry)
- institution list file (single entry)
- inventory data file (variable entry)

No modifications are necessary to the two single entry files, and the variable entry file is capable of accepting the physiological records defined below (see records).

2. New files

- Topographic file
- Etiological file

These two files will be simple look-up tables of the disease nomenclature system referred to above in the Information Requirement section.

This system uses a 4 digit code associated with a brief description. The tables will be used for editing and report generation procedures.

These two files will each be approximately 2000 records in length.



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B. Records

1. Physiological Norms Segment

- a. One record type each for the Topographic and Etiological look-up tables will probably be required.
- b. There will probably be three record types concerned with the physiological data.

2. Other Segments

Each of the other four segments will require one record type for each segment.

C. Reports

The media of the reports will remain the same as that currently being used by ISIS:

1. Microfiche only, or
2. microfiche and hard copy.

The option is user specified.

D. Subsystem Designation and Description

SS-20 Vet Edit/Input

1. Disease Nomenclature Code

No editing of these records can be performed by computer. The records will be produced by the ISIS staff in the form necessary to build the file.

2. Physiological Norms

To maintain compatibility with the variable entry file (the inventory data file) the records will be formatted in the same length and will use the same first six data elements:

- a. card codes (DD-6149 & 6150)
- b. taxonomic code (DD6101)
- c. institution code (DD6110)
- d. specimen ID (DD6116)
- e. transaction date (DD6167-6169)



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Dale B. Mager

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The editing of these elements will be identical to that coded for the ISIS - Vital Statistics subsystem. The only criteria for the initiation of a new physiological data record in the variable entry file will be the existence of that animal in the file (defined by taxonomic code, institution code and specimen code identity).

Due to variability in the selection by the veterinarian of laboratory tests to be completed on a blood sample, a single physiological record will be split into three input record types. The first input record will establish the physiological record in the variable entry file as described above. The second and third input records may or may not be present for input into this physiological record. However, their entry into the record requires the existence of the first record of the three possible types.

The one editing procedure which will be new to the system will be the verification of the topographic and etiologic codes using the look-up tables described above.

SS-21 - Physiological Records Survey

The survey report will require counting of the physiological records available for use in predicting the physiological norms. This survey will involve extracting the physiological records, counting them by animal form and sub-categorizing and counting them by disease state (using the topographic and etiologic code system described above). This data will form the first segment of the report. The physiological records will then be sorted by institution. The records will then be counted (as described above) within each institution and this information printed for each institution.

SS-22 - Physiological Norms Summary

This report will be generated using all the physiological records in the variable entry file. On the basis of the request by the ISIS - Systems Manager certain animal forms will be selected for summarization. As indicated in the Information Requirements, input data will be used as further selection criteria to subclassify these data before the summaries are performed. The means and standard errors can be calculated using routines found in the System/360 Scientific Subroutine Package. Thus, routines will be required to transform the data formats found in the physiological data records into a form acceptable by this routine and the transformation of the means and standard errors into a format suited to the Physiological Norms Summary report.



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SS-23 - Institution Veterinary Record

This report will involve the extraction of the physiological records from the variable entry file by institution. The records will be sorted by taxonomic code and animal ID within taxonomic code to order the records by animal form and individual animal within the form. The records will be transformed into columns of test values ordered by date so that the veterinarian can scan the data rapidly to perceive trends in the physiological data. Only in the cases where ten or more animals in a zoo have physiological data records will norms for the laboratory tests be determined. These calculations will be identical to those described in SS-22 above.



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PROJECT EVALUATION

Rational for Development

The need for this subsystem in the treatment of captive animals is quite real. The current procedure in establishing normal value for laboratory tests is by the reporting of values in various professional publications. This suffers from incomplete surveys of the entire zoo animal population and in many cases limited blood sample sizes from which to determine these norms. Other problems suffered by the SEAMAK system were incomplete animal identification and incomplete disease diagnosis. The former problem will be solved since the animal's vital statistics will already reside in the ISIS files. The latter problem will be solved by the adoption and strict adherence to the standard disease nomenclature system. Thus, the development of this subsystem segment will provide the veterinarians with accurate physiological norms which can be used for disease diagnosis. An additional benefit after the data base has been collected for some time will be the ability to evaluate each physiological test for each disease state to define which parameters are diagnostic for the disease states.

Project Staffing

ISIS Analyst - D. Makey

Responsibilities:

1. Development of Phases 1,2,3,4I and 9.
2. Development of associated Data Management definitions.
3. Co-development of Phase 4II.
4. Consultation during Phases 5-7.

ISD Analyst - to be determined

Responsibilities:

1. Review of Phases 1, 2 and 3.
2. Co-development of Phase 4II.
3. Minor consultation during Phases 5-7.

ISD Programmer- to be determined

Responsibilities:

1. Develop programs associated with SS-20 through SS-23.
2. FORTRAN AND COBOL knowledge is required.



pride.
DOCUMENTATION FORM

ZO			
SYS	SS	PC	PG

NAME: ISIS - Veterinary Record

PAGE 2 OF 3

PREPARED BY

Dale L. Makoy

CHECKED BY

Project Estimate

As indicated previously, this estimate is based on the premise that the programmer developing Phases 5-7 will be familiar with the existing ISIS system because of a Phase 8 to be performed just prior to the beginning of this subsystem.

Effectiveness ratings used in development of the schedule were:

Project Management	75%
Data Management	75%
System Analyst	75%
Programmer Analyst	50%



pride.

ESTIMATING WORK SHEET

20				
PROJECT	SYS	SS	PC	PG

NAME: ISIS - Veterinary Record

DATE / /

SCOPE OF ESTIMATE Phases 1-7 (ISD Costs Only)

EFFECTIVENESS RATE USED 75% SA+DM; 50% PA

TYPE EST. _____

PHASE	ACT.	PROJ. MGT.	DATA MGT.	HOURS			COMPUTER TIME	Cust. Service		SCHEDULE		ASSIGNED TO
				SYSTEM ANALYSIS	PROGRAM ANALYSIS	OTHER		START DATE	END DATE			
1-3		-	35	30								
4-2		-	15	110						27 Feb		
5-7	20	-	-	-	140	0.5	8	1 March	30 April			
5-7	21	-	-	-	80	0.5	8	5 April	7 May			
5-7	22	-	-	-	130	0.5	8	26 April	18 June			
5-7	23	-	-	-	100	0.5	8	10 May	25 June			
TOTALS		-	50	140	450	2	32					

RECAP:

	HOURS	RATE PER HOUR	COST
PROJECT MANAGEMENT	-	-	-
DATA MANAGEMENT	50	\$ 15.50	775.00
SYSTEM ANALYSIS	140	\$ 15.50	2170.00
PROGRAM ANALYSIS	450	12.50	5625.00
COMPUTER TIME	2	\$ 400.00	800.00
OTHER (Cust. Service)	32	\$ 10.50	336.00
TOTAL			9706.00

NOTE: USE REVERSE SIDE FOR ROUGH DESIGN

DATE PREPARED _____

PREPARED BY Linda Sjoberg

APPENDIX III



Minnesota Zoological Garden
Wentworth Office Center
33 East Wentworth Avenue
West Saint Paul, Minnesota 55118
Telephone (612) 227-9216

January 2, 1976

ISIS - A COLLECTING AND SHARING OF CAPTIVE ANIMAL STATISTICS

Modern day zoos are faced with the challenge of developing self-sustaining populations of captive exotic species and perhaps in selected instances of providing the only reservoir for species on the verge of extinction. To meet this problem it is necessary to develop policies for the management of gene pools over multiple generations and to collect data and share it. American and European zoos are confronting this challenge head on through the International Species Inventory System (ISIS). The collection of census and vital statistics data is presently being accomplished by ISIS of the American Association of Zoological Parks and Aquariums (AAZPA).

ISIS is housed at the Minnesota Zoological Garden offices, Wentworth Office Center, 33 East Wentworth Avenue, West St. Paul, Minnesota 55118, and will move to the zoo site in Apple Valley, Minnesota upon completion of this new facility (phone - (612)227-9216). Use of the IBM 370-158 computer, part of the state computer system, is also made possible through the relationship with the Minnesota Zoo. Personnel for ISIS includes Linda Murtfeldt, ISIS system manager and zoological records supervisor for MZG, and data processor, Kim Hastings.

The program currently has 185 zoos signed as participants. One hundred and six zoos are actively submitting data on their mammal collections. Seventy-three zoos have completed their inventories and are on a current basis. Data forms have been received on more than 26,000 mammals. Computer output inventories are being returned to all zoos who have completed submission of their data. The first national inventory of all data available to the system was completed in early May. Copies of this national inventory in a microfiche form have been returned to all participants who are submitting data.

Each participating zoo has been provided with a set of three manuals: the ISIS Mammalian Taxonomic Directory, the ISIS World Geographic and Zoological Institution Directory, and the ISIS Institution Procedures. The Mammalian Taxonomic Directory contains a listing of all living mammalian species, each taxon including the scientific name, a vernacular name, and the approximate distribution in the wild. The World Geographic and Zoological Institution Directory contains a hierarchical code system for the listing of all regions, subregions, countries, states and zoological institutions (zoos, aquariums, museums, dealers, special collections and researchers) throughout the world. The complete Avian Taxonomic Directory is near completion.

One data sheet is filled out for each animal within a zoo. This form contains information on taxonomy, individual identification, sire and dam, place of birth or capture location, sex, age, transactions which occur and between whom, hybrid status, death and autopsy information, tag and tattoo numbers, studbook identification, marine mammal permit numbers, postentry quarantine numbers, endangered species permit numbers, price and color phase. Each zoo keeps one copy of the form for its files and sends the original to ISIS. After review for completeness and accuracy by the system manager, the information is punched on keypunch cards and then sent to the computer for input.

The first steps in the revision of the SEAMAK physiological norms data system for inclusion in ISIS were taken at the AAZV meeting in Atlanta in 1974. At this time a group of veterinarians reviewed a proposed data form based upon the original SEAMAK form which was modified to a standard 8½x11" size. The second draft form based upon these discussions was prepared and circulated to the initial committee and several other veterinarians for comment and review. These comments were then collated and resulted in our first trial run data form. The format of this form is shown as figure #1. It is prepared in a manner similar to that of the ISIS New Inventory Data form. The first sheet is filled out with the required identification information for the animal and with the animal laboratory data. It should be stressed that not all laboratory data blanks have to be completed. Only the data available from the blood sample is required. This first sheet was printed on NCR paper which serves as its own carbon. The second sheet is heavier duty stock suitable for use as a permanent record and easily filed. The back of the second sheet contains ruled lines for entry of any other data the veterinarian may desire. One-thousand copies of this form were printed and distributed to 25 zoos currently participating in the mammals program of ISIS. The veterinarians were requested to complete some of the forms and on the basis of their experience report back to us with any suggestions or comments, and to submit the copies of the completed form. To date we have received forms from 13 veterinarians. Each participant was also sent a draft of a manual containing instructions on how to complete the form and with comments concerning the reasons for some of the data entries requested. The response from this trial-run is being used as the data base for systems analysis and eventually for computer programming. We cannot begin entering data into the computer data bank until programming is complete. We will transfer the data base in the SEAMAK computer program to the ISIS Physiological Norms program when these programs are completed.

It is planned that the output or reports will be prepared in two forms. Both will be distributed annually to all participants. The first will be a report back to the participating veterinarian and zoo on all data from their zoo arranged by species and by individuals within species. Note that this makes unique identification of each individual an imperative part of participation in the program. This can be accomplished by utilization of the ISIS Specimen ID number as provided on the norms data form. The second report will be a summary by species of all data in the data base. If data on more than ten animals are available for a given assay then the results will be presented in the form of a mean standard deviation and standard error. If fewer than ten data items are available, then simply the raw data will be presented. It will be possible to develop a more frequent reporting interval if this appears desirable as experience with the system is developed.

Data from sick or traumatized animals can also be included. The current data forms includes a set of categories indicating whether the animal is normal or abnormal. However, if maximum benefit is to be gained from use of the information from ill animals, it will be necessary to employ a coded diagnostic system to specify the illness or diagnosis. For this purpose we employ the Standard Nomenclature of Veterinary Diseases and Operations, First Edition (1966) and Coding Supplement (1971), U.S. Department of Health, Education, and Welfare, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. We cannot do this coding for the participants. This will necessitate your becoming familiar with the standard nomenclature and employing these forms if we are to build up a data base for specific diseases. This same nomenclature will be used in the autopsy subprogram to deal with death data.

The Physiological Norms program and all of its activities will be housed at the Minnesota Zoological Garden under the direction of the ISIS Systems Manager, Mrs. Linda Murtfeldt. This will provide an institutional base for the data system and avoid the vagaries of a research operation. We do not as yet know what it will cost to operate the system when it becomes functional. I would estimate a cost of about \$2,000-3,000 per year depending upon data volume. We have to date received \$18,000 for the development of the system in conjunction with the ISIS program. The cost for completion of the computer programming will be about \$8,000.

Other plans and developments of the ISIS system of interest to the zoo veterinarian include development of an autopsy program and a life history data program. The life history data program is being developed by a subcommittee chaired by Paul Linger of the Denver Zoo and includes a Veterinarian, Dr. Wilbur Amand of the Philadelphia Zoo. Dr. Amand has submitted a code for use by veterinarians which is available to any interested veterinarian who would provide us with additional input. Analysis of the current ISIS data base yields the indication that approximately 3,200 specimens die in zoo collections each year. Of these, approximately 1,600 received autopsies and some unknown fraction of these also receive histopathology diagnosis. Based upon this information and the request of a number of veterinarians and pathologists we now plan to develop an autopsy data program separate from the death code data included on the ISIS New Inventory Data form. It is our intention to develop this program in very close communication with Dr. Appleby and the World Health Organization (WHO) autopsy program currently being utilized in Europe. Most of the data included on the WHO form is currently a part of the ISIS data base except for the actual diagnosis and several observations on the condition of the specimen as received by the pathologist. The diagnoses are coded utilizing the standard nomenclature. Thus, it should be very easy to incorporate an autopsy program into our current ISIS data system, if a sufficient number of veterinarians and veterinary pathologists wish to cooperate and participate. If you have any comments or suggestions to make please send them to us in care of Mrs. Linda Murtfeldt at the ISIS office. We will then report back to the AAZV by way of the Journal of Zoo Animal Medicine.

APPENDIX IV

APPENDIX V

TENTATIVE FORMAT FOR PEDIGREE REPORTS

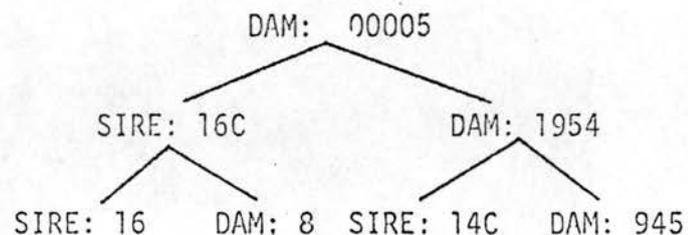
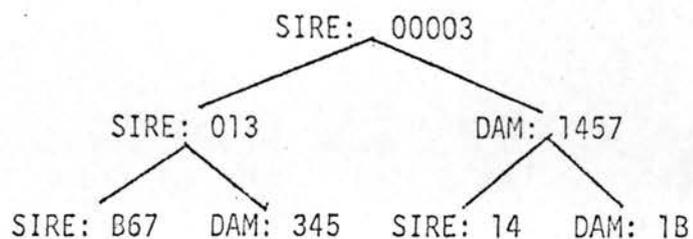
LEONTIDEUS ROSALIA (3SSP)/GOLDEN MARMOSET/

06-007-003-001-001

NATIONAL ZOOLOGICAL PARK

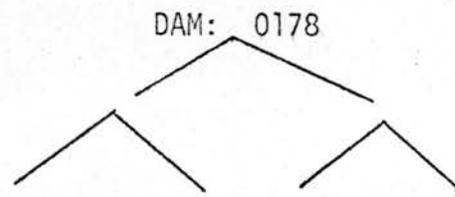
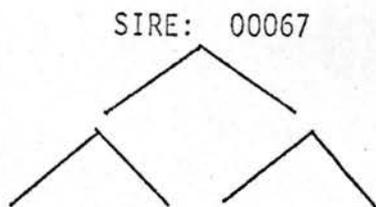
00006 SPECIMEN ID 01/01/75 CAPTIVE BORN AGE: 6 MO SEX: FEMALE
DAM: 00005 SIRE: 00003 STUBBOOK NUMBER: 39-A

FAMILY TREE



00008 SPECIMEN ID 16/05/70 OTHER SOURCE AGE: 2 YR. EST SEX: MALE
INSTITUTION BORN LOC: 310514006 LINCOLN PARK ZOOLOGICAL GARDENS
V/R ID: 6543 ACQ. COST: \$300. DELIVERY COST \$15.
DAM: 0178 SIRE: 00067 STUBBOOK NUMBER: 53-C

FAMILY TREE



OFFSPRING

00009 STUBBOOK NUMBER
016 STUBBOOK NUMBER STILLBORN
754 STUBBOOK NUMBER

APPENDIX VI

GENE POOL CONSERVATION AND BREEDING STRATEGY FOR ZOOS

N. R. Flesness and U. S. Seal, Ph.D.

Veterans Administration Hospital
Minneapolis, Minnesota and
Department of Biochemistry, University of Minnesota
Minneapolis, Minnesota 55417

May 1975

GENE POOL CONSERVATION AND BREEDING STRATEGY FOR ZOOS

INTRODUCTION:

It is clear that zoos will rely increasingly on captive breeding populations. Maintaining such breeding groups will probably become a major role and a major responsibility.

Whether or not wild populations survive, one expects that the captive breeding population will be nearly closed, in the sense that further introductions of wild stock will be infrequent. Most such groups will be maintained at the level of hundreds of animals or less. Over the long term, continued propagation of such small closed groups has major genetic consequences. The population loses most of its genetic variability, and becomes highly inbred.

The rate and results of this inbreeding process are subject to control. What is required is partial or complete control of matings, and the use of a carefully chosen mating system.

IMPORTANCE OF GENETIC VARIATION:

Most fundamentally, genetic variation is the basis for future adaptation to changing environments. A basic theorem of evolutionary genetics is that the rate of adaptation is proportional to the genetic variance in fitness. A population with no genetic variation persists only as long as the environment stays within the tolerance limits of one individual. All members of the population have roughly the same tolerance; beyond this range they all fail. The global rate of environmental change is presumably increasing due to man, so populations with reduced potential rates of adaptation can be expected to vanish.

A relevant example of this is the relationship between genetic variation and disease resistance. Disease producing organisms are constantly evolving, new virulent strains appear sporadically. A population with normal genetic diversity has a good chance of including at least a few individuals who will happen to be resistant to the new, improved, pathogen. The risks of genetic uniformity were demonstrated a couple of years ago by a new form of corn blight which

swept across fields of genetically uniform hybrid corn. The new strain appeared late in the season, but the loss was still 6% of the U.S. corn crop. If the corn crop had stayed the same the next year, the loss would have been spectacular. However, the producers of corn seed had other genetically different strains at hand, and some were found to be resistant to the new blight. These were used; from the point of view of the blight, the corn made a sudden adaptation. Unfortunately, if the original genetic diversity of an animal population is lost, there may be no genetic insurance policy.

There is another possible role of genetic variation in natural populations. This is known as the Niche-Width Variation Hypothesis, and is still a subject of controversy in population biology. The idea is simple; genetically different individuals will utilize resources in slightly different ways, reducing the amount they compete. This means the population can be larger. As larger populations are thought more likely to persist, this effect may be important.

INBREEDING:

In most respects inbreeding is harmful. In animals, significant inbreeding usually causes a reduction in viability, growth rate, fertility, fecundity, lactation, and inter-species competitive ability. There are several reports of thresholds, where the effects suddenly become serious as a level of inbreeding is reached in the range 0.25 to 0.75. To generalize much data of variable quality, small lines inbred rapidly by brother-sister mating have at best a 5% chance of surviving 20 generations. The rare line that survives this long will usually persist indefinitely. Apparently the founders were unusually low in harmful recessives, or selection during inbreeding was unusually effective in eliminating them. Many agricultural stations have intentionally tried to establish inbred lines of various animals in the hopes that recrossing them would be as productive as was the case with corn. The results of great efforts have been near universal extinction of the lines.

An important, but much ignored point is that the rate of inbreeding is crucial. Almost all literature data on the consequences of inbreeding is for the maximum possible rate, brother-sister mating. If animals are inbred more slowly, natural selection has a better chance to eliminate harmful recessives. It is very difficult to extrapolate the data to slower rates of inbreeding, but it is at least clear that the slower the rate of inbreeding, the less serious the consequences of reaching a given level of inbreeding.

There are two cases where minimizing the rate of inbreeding might not be desirable. One is the situation where an attempt is being made to domesticate an animal. Examples are musk oxen in Alaska, and eland in the Soviet Union. In this case, if useful genetic variation still exists in the population, selecting for it will involve intentional inbreeding. The other case is a paradox, and will be discussed below.

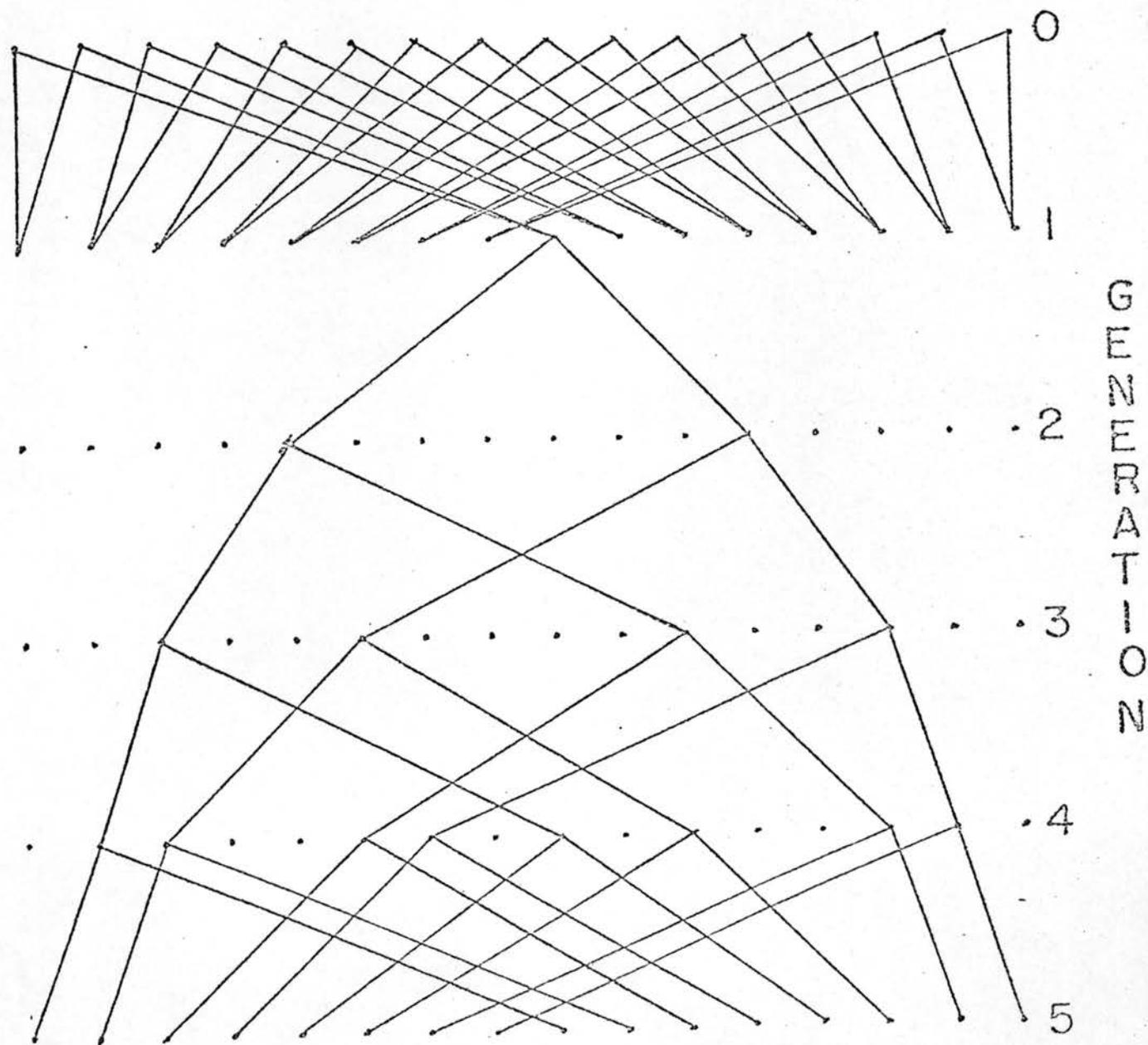
METHODS TO CONSERVE GENE POOLS:

There is an extensive literature on the subject of gene pool conservation. There have been several national and international symposia on the topic, and numerous publications. Unfortunately, almost all the work is on plants. Plants are a very much simpler problem, and there are now a considerable number of plant germ plasm collections, where plant genetic diversity preservation is the primary goal. The few publications which discuss this problem in animals are unanimous in the recommendation that something be done. I am unaware of any specific proposals as to just what.

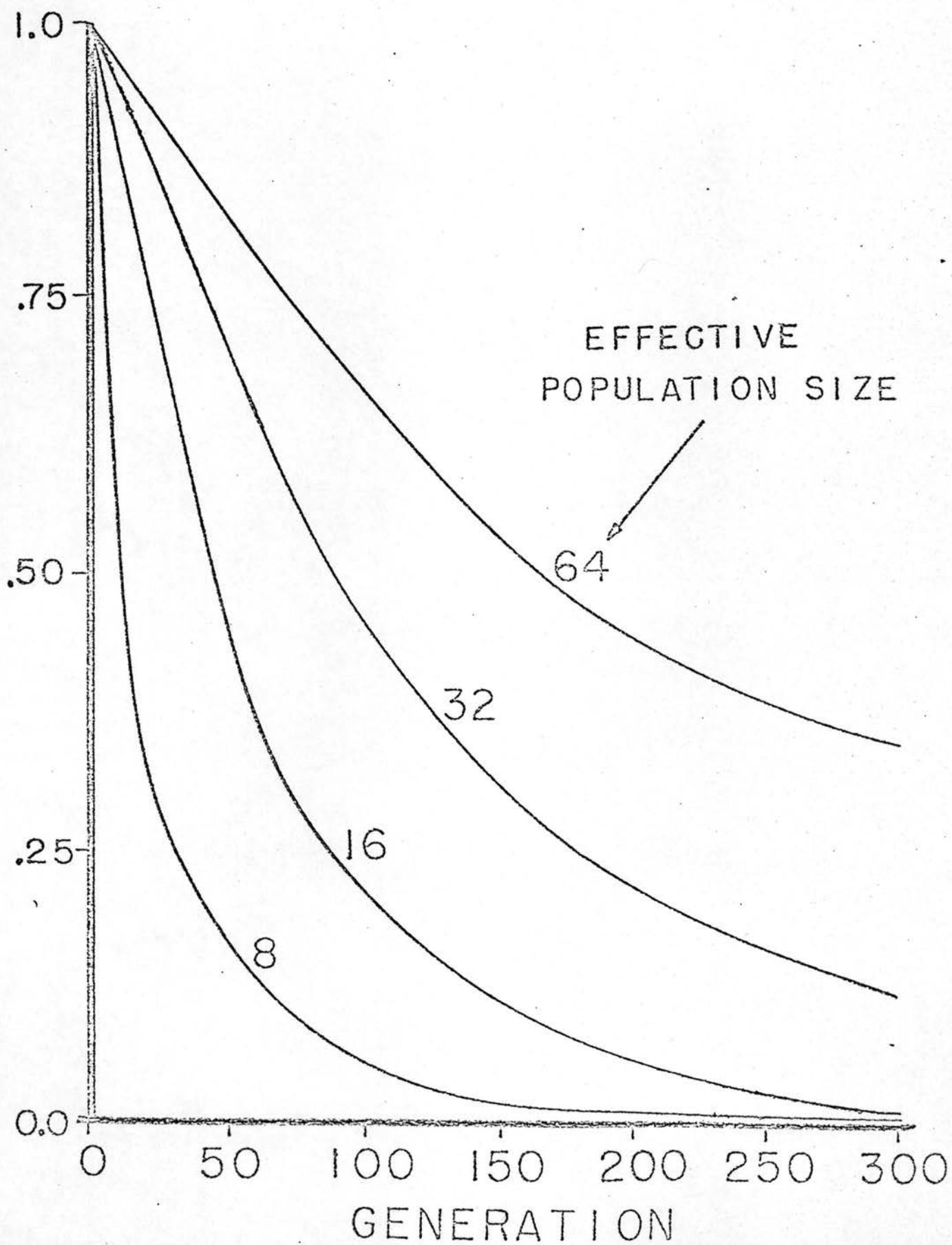
Actually, there are two breeding programs that are the optimal solution to the problem of animal gene pool conservation. They are very different, and possibly both should be used on each species. The first was proposed by Sewall Wright in 1921, and is known as "Maximum Avoidance of Inbreeding". It is the theoretically best answer to slowing the inbreeding process, and therefore slowing the loss of variation. It amounts to mating the least related animals with each other in each generation. The next page shows the scheme, and the following page shows its' effectiveness.

MAXIMUM AVOIDANCE
OF INBREEDING

$N = 16$



DECAY OF VARIABILITY;
MINIMUM INBREEDING

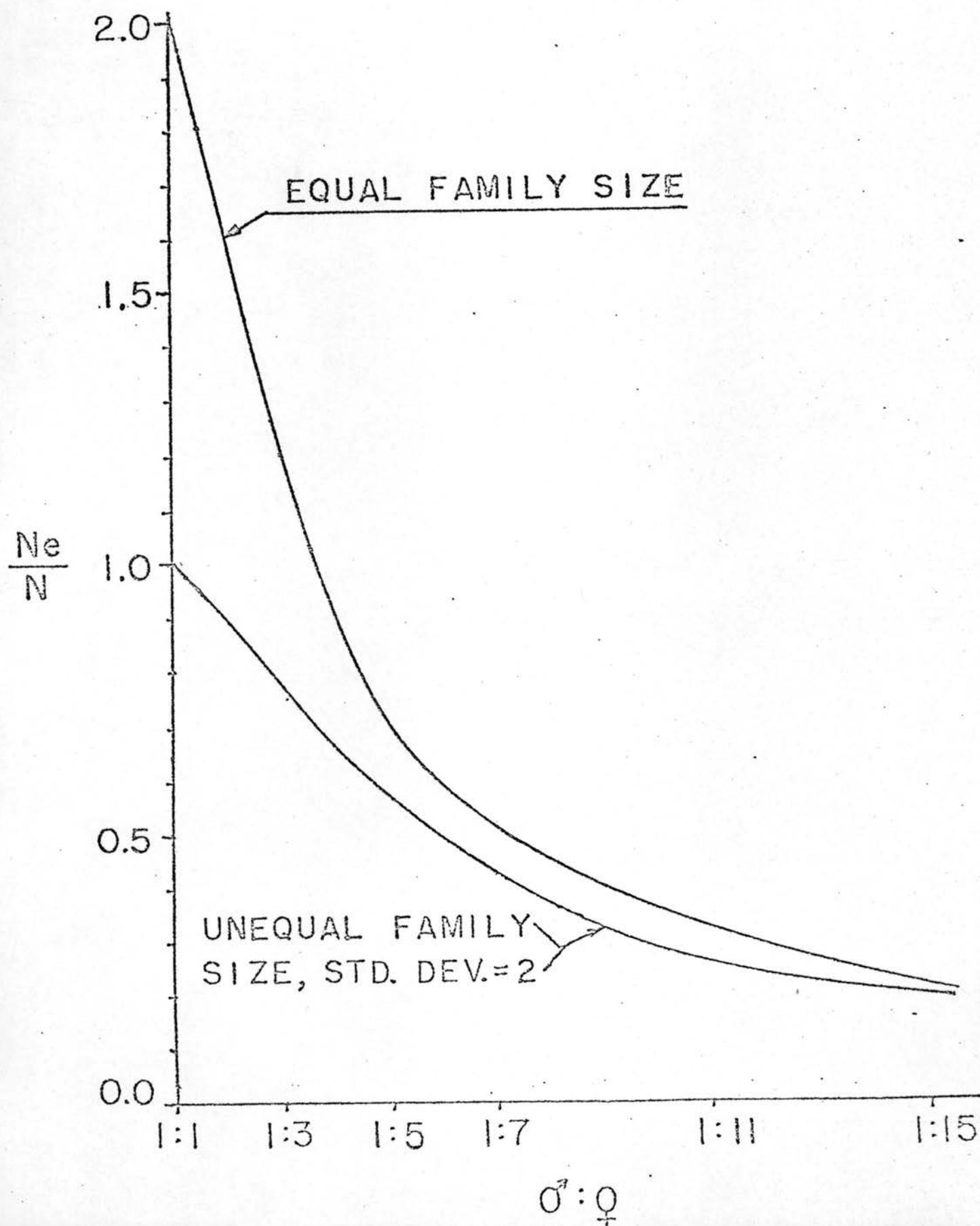


For population sizes in the range 50 to 100 or greater, this mating system is quite effective in preserving variation. Note that half of the variability should remain after more than 100 generations. Ultimately, of course, the population will reach equilibrium at a very low level of variation. The population size factor is called "effective population size", which bears explaining. This is a comparative term, and is based on the characteristics of a population which mates at random, and whose family sizes vary in such a way that the standard deviation of family size equals two. Normal zoo practice probably results in an effective population size substantially less than the actual number of breeding adults. In the future, the ISIS records will allow this to be measured. Adjusting two aspects of the population can give an effective population size equal to twice its' number of breeding adults, a profound improvement from the point of view of preserving genetic variation in a finite population of animals. The next page illustrates the effects of sex ratio and equality of family size. For equal numbers of males and females, and equal offspring number for each mating, the effective population number is twice the actual number. As the breeding program deviates from these conditions, the effective number, and thus the success in preserving variation, drops rapidly. Another way to say all this is that a population of 16 with 1:1 sex ratio, equal family size, mating most distant relatives, will preserve genetic diversity as effectively as a population of 64 with a 1:5 sex ratio and a standard deviation of family size equal to two.

The second optimal method to preserve genetic diversity is paradoxical, in that it involves establishing several inbred lines. Each should be roughly four to eight animals, and this group would be inbred. The use of a line size greater than two will reduce the risk of loss substantially. Each such inbred line would preserve indefinitely the genetic diversity of one wild animal. At some future date, the lines would be recrossed and the variation combined into one population for use in restocking, etc.

This method is the only one that preserves substantial variability indefinitely, but it is also the most risky. The consequences of its' use are still being worked on, but provisionally it might be worth doing using excess animals from a maximum avoidance scheme as described above.

SEX RATIO VERSUS EFFECTIVE POPULATION SIZE



WHAT DO WE WANT TO PRESERVE?

As a minimum I think we all agree that species should be preserved for aesthetic reasons, as examples of the diversity of the organic world. From this point of view, what is important is to absolutely minimize the chances of extinction. A breeding program with this goal would involve some selection for adaptation to zoo conditions. Animals would be bred, and especially successful individuals or pairs would be allowed to produce numerous offspring, who would thus make up a disproportionate part of the next generation. Their parents would have had a high "captive fitness". This kind of breeding program is currently nearly universal. As an example, the Bronx tigress mentioned by W. Conway in his presentation at the AAZPA Meetings last year, had thirty surviving offspring, most of whom are also highly successful. It's important to realize that this represents strong selection and considerable loss of genetic diversity. The results from continuing this program are substantial loss of diversity very quickly, and eventual partial domestication. This is not necessarily a bad result at all, but represents a choice to be made.

If this route is chosen with a given species, it's also important to realize that it curtails further options. The loss of variation would be very rapid, the possibility of recovery small. If a population with greatly reduced variability were expanded in size, one would have to wait hundreds to thousands of generations for substantial recovery of genetic diversity by mutation and recombination.

Alternatively, the goal of preservation can be to maximize the preservation of variation, and thus increase the still small chances of re-introduction. For multiple reasons, the success record of re-introductions is dismal, and significant genetic diversity of stock is certainly no guarantee of success. It is highly probable, however, that low genetic diversity nearly guarantees failure.

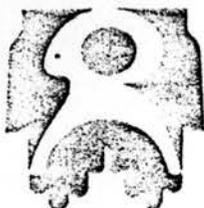
A breeding program with this goal would be an attempt to slow down adaptation to captivity. The most important rule would be to restrict family sizes equally. Evolution is differential reproductive success, and it would be desirable to stop evolution. Following one or both of the mating systems which maximize genetic diversity would also be critical.

This paper represents conclusions from the halfway point of this project, undertaken for the Minnesota Zoological Garden.

Yet to be completed are models which consider the effects of infrequent wild introductions, the level of interchange between various zoo populations, each of which is under a particular mating system, and further study of the possibility of using multiple inbred lines to conserve genetic variability.

Also underway is a computer program package which will evaluate the breeding history of those animals for which we have records. Inbreeding coefficients, and other pedigree data will be computed. Przewalski's horse is being done first. The program has the potential of monitoring breeding populations from ISIS record data at periodic intervals.

APPENDIX VII



Minnesota Zoological Garden
Wentworth Office Center
33 East Wentworth Avenue
West Saint Paul, Minnesota 55118
Telephone (612) 227-9216

December 3, 1975

MEMO TO: Mr. John Werler, President, AAZPA
Mr. Robert Wagner, Executive Secretary, AAZPA
Mr. John Mehrrens, Chairman, Wildlife Conservation Committee, AAZPA
Mr. William Braker, Chairman, Legislation Committee, AAZPA
Members, AAZPA, ISIS Committee
Members, AAZPA, Wildlife Conservation Committee

FROM: AAZPA - ISIS Committee
Donald D. Bridgwater, Chairman

SUBJECT: Captive Self-sustaining Populations Petition Submitted to USDI.

On November 14, 1975, ISIS, on behalf of the AAZPA, submitted petitions with supporting data for change of status of five endangered species to captive self-sustaining populations in accordance with Paragraph 17.7 of the Endangered Species Act, December, 1973, as published in the Federal Register, Vol. 40, No. 188, September 26, 1975, page 44417.

The species included were: Panthera tigris (tiger), Panthera pardus (leopard), Panthera onca (jaguar), Lemur catta (ring tailed lemur), and Lemur macaco (black lemur).

The USDI has indicated that its legal department will review past permit requests for these species and the petitions will then appear in the Federal Register immediately. There will then be a 60 day comment and review period with action anticipated in March, 1976. This type of procedure was discussed in Calgary and later discussed in Washington, and the action has now taken place.

Currently, procedures exist, as published in the Federal Register, Vol. 40: 188;9:26:1975, page 44426, Section 17.33, for appropriate institutions to apply for two-year permits to conduct sale, exchange or transfer of such C/P populations between licensed institutions. The mechanism to handle such requests are not currently extant, and it is imperative that if such valid requests and applications are made now, test cases will simplify and make effective procedures possible. It will also provide solid documentation for consideration in further congressional oversight hearings scheduled in December or January.

It would now be appropriate for every zoo meeting the basic qualifications to submit applications for C/P permits for the above species when they appear in the Register in order to assist in the establishment of procedures and further ease the situation.

2.

As a result of this review, a number of observations have been submitted by interested parties, and they boil down to two:

1. There is still a great amount of time and paper work involved in making these permit applications, and there has been the hope that some broad range rule-making might provide blanket permits to be issued for all C/P species, or even for all species on the lists currently being managed in zoo collections. This is perhaps a possibility, but certainly not in the foreseeable future and certainly not without solid data and logic to support it. Thus, we feel the approach outlined above is an absolute necessity.

2. The USDI's definition of a C/P species refers to the species in general and does not include the races or subspecies, many of which are clearly not self-supporting yet in captivity, for instance, the Persian leopard, Amoy tiger, black lemur, red-fronted lemur, etc. We must remember that the USDI's C/P definition is not the definition which we as animal management personnel would make to manage a population. However, the current rule-making will not change requirements for any import of such species from the wild or the taking of any animals from wild populations, or the criteria for acquiring such animals. Also, our professional responsibility is to make sure that efforts to manage such populations of these subspecies or any species is done in an intelligent way, thus preventing or minimizing any use of the precious reservoirs which we are privileged to husband.

Thus, within the allowed rule-making, we have an opportunity to use both numbers and logic to ease the restrictive situation, and further, to demonstrate our ability to act responsibly within our own professional group.

I have reviewed the situation with appropriate AAZPA leadership and had hoped that this letter could have been sent out earlier, but, in summary, there is a need for procedural test cases, the provision of good data, and a concerted effort on the part of the AAZPA to demonstrate ability to manage our own resources effectively.

The data contained in the petitions to the USDI will be published in the January Newsletter, and a status summary on future development programs for ISIS will be forwarded in late December.

If there are particular concerns, please respond.

- - -

SUMMARY STATEMENT OF PETITIONS
Submitted to the U. S. Department of the Interior
November 14, 1975

INTRODUCTION

On November 14, 1975, the AAZPA - ISIS Committee submitted five petitions to the Department of the Interior requesting change of status for five species of mammals listed as rare and endangered [Panthera tigris (tiger), Panthera pardus (leopard), Panthera onca (jaguar), Lemur macaco (black lemur), and Lemur catta (ring-tailed lemur)] to captive self-sustaining population status.

The following is a condensation of the statements and data presented separately in each of these five petitions:

GENERAL STATEMENT

The International Species Inventory System Committee (ISIS) of the American Association of Zoological Parks and Aquariums (AAZPA) requests your consideration of _____ for designation as a captive self-sustaining population according to paragraph 17.7 "Captive Self-Sustaining Populations" of the regulations governing "Endangered and Threatened Wildlife and Plants", as published in the Federal Register, Volume 40, Number 188, Friday, September 26, 1975, page 44417.

The ISIS Committee is an official committee of the AAZPA charged with the responsibility of collection of census and vital statistics information on wild animals held in captivity in zoos in the United States and other participating countries. These data are summarized annually in the form of the ISIS species inventory. This inventory is produced on a calendar basis. The data in the following material are derived from the report covering the year 1974, as produced on August 28, 1975. This report contains a summary of information on 14,345 living animals from 40 percent of the American zoos. The total population of mammals held in captivity in the United States is estimated at approximately 36,000 based upon data received from 176 zoos in this country, and based on data published in the AAZPA membership director, Zoos and Aquariums in the Americas, 1974-1975.

The information in the following report is presented in terms of the actual number of animals of each species currently included in the ISIS inventory and as a projected estimate of the total number of animals actually held in captivity in the United States. This total is obtained by multiplying the inventory number by a factor of 2. Several evaluations suggest a factor of 2.5 could be used with accuracy, but in an attempt to establish conservative numbers, a factor of 2 is used.

It is the recommendation of the ISIS Committee that the following species be favorably considered for reduction in status to that of a captive self-sustaining population on the basis of the data presented, and be treated as "threatened" wildlife.

These data indicate that the goals of maintaining the population of this species and producing a surplus have been obtained. The current development of explicit breeding management strategies, the ability to exchange animals readily between qualified zoos, and the continuing development of the AAZPA - ISIS data base assure continued success. Hence, we maintain that this population is capable of being designated as a captive self-sustaining population.

GENERAL DATA SUMMARY

I. Approximate Number of Specimens Existing in Captivity in the U.S.A.

<u>Species</u>	<u>Inventory No.</u>	<u>Projected Inventory No.</u>
Tiger	289	578
Leopard	217	434
Jaguar	141	282
Black lemur	146	292
Ring-tailed lemur	169	338

II. Age and Sex Ratios of Captive Specimens (Inventory Numbers).

<u>Species</u>	<u>Age</u>	<u>Sex Ratio</u>
Tiger	103-1yr; 36-2yr; 16-3yr; 17-4yr; 16-5yr; 54-10yr; 28-15yr; 14-20yr; 5 more than 20yr.	1/1.3
Leopard	52-1yr; 13-2yr; 13-3yr; 16-4yr; 20-5yr; 70-10yr; 19-15yr; 8-20yr; 6 more than 20 yr.	1/1.1
Jaguar	31-1yr; 18-2yr; 9-3yr; 12-4yr; 13-5yr; 33-10yr; 17-15yr; 5-20yr; 3 more than 20 yr.	1/1.0
Black lemur	21-1yr; 11-2yr; 17-3yr; 18-4yr; 19-5yr; 29-10yr; 21-15yr; 1-20yr; 9 more than 20 yr.	1/1.1
Ring-tailed lemur	24-1yr; 13-2yr; 18-3yr; 15-4yr; 16-5yr; 55-10yr; 18-15yr; 3-20yr; 2 more than 20 yr.	1/1.4

III. Number of Persons Who have Successfully Propagated the Species in Captivity.

<u>Species</u>	<u>INSTITUTIONS</u>			
	<u>Holding Species</u>		<u>Successful Propagation</u>	
	<u>Inventory No.</u>	<u>Projected No.</u>	<u>Inventory No.</u>	<u>Projected No.</u>
Tiger	54	108	25	50
Leopard	52	104	18	36
Jaguar	46	92	12	24
Black lemur	9	18	2	4
Ring-tailed lemur	26	52	10	20

IV. Number of Generations of Species Successfully Bred in Captivity.

According to records in Multiple Generation Births of Wild Animals, International Zoo Yearbook, Nicole Duplaix-Hall (Editor) Vol. 13:1973, pp. 408-409, the greatest number of generations recorded to be bred in captivity is for tigers 4, leopards 4, jaguars 4, black lemurs 5, and ring-tailed lemurs 3.

V. Comment on Likelihood that Persons Owning or Controlling Such Species Will Cooperate to Insure their Continue Existence and Reproduction.

The following answer was submitted for each species: "The AAZPA's ISIS program initiated in October, 1973, has as its explicit purpose insuring of the continued existence and reproduction of endangered species, in this case, the _____ . The development of a studbook and pedigree history program, authorized by the AAZPA at their Annual Meeting in Calgary, Alberta, Canada, in September, 1975, will provide the data for long term management of these animals in captivity."

VI. Number of Requests to Take or Import Wild Specimens of These Species During the 24 Months Prior to the Date Consideration of the Species was Undertaken.

The AAZPA Wildlife Conservation Committee has reviewed no (0) requests during the past 24 months to take or import wild specimens of tigers, jaguars, black lemurs, or ring-tailed lemurs. The Committee reviewed one (1) request to import a wild specimen of Afghanistan (Persian) leopard by the Lincoln Park Zoo, Chicago, Ill.

VII. Ratio of Wild-Born vs. Captive Specimens in Captivity.

<u>Species</u>	<u>Sample Size</u>	<u>No. Wild Born</u>	<u>No. Captive Born</u>	<u>Origin Unknown</u>	<u>Ratio</u>
Tiger	144	2(2%)	133(92%)	9(6%)	1/67
Leopard	90	5(5%)	64(71%)	21(23%)	1/13
Jaguar	60	1(2%)	43(71%)	16(27%)	1/43
Black lemur	140	26(19%)	106(76%)	8(5%)	1/4
Ring-tailed lemur	110	9(8%)	88(80%)	13(12%)	1/10

STATUS OF WILD MAMMAL SPECIES

HELD IN AMERICAN ZOOS

U. S. Seal, Ph.D.

Board Member, Minnesota Zoological Garden

Co-Developer of International Species Inventory Systems

Professor, Dept. of Biochemistry,

University of Minnesota, Minneapolis, Minnesota 55455

APPENDIX VIII

PROPOSED TRANSFER FORM

Scientific Name	<i>SENDER</i>	<input type="text"/>
Common Name	<i>RECIPIENT</i>	<input type="text"/>
	<i>SPECIMEN ID</i>	<input type="text"/>
	<i>SPECIMEN ID</i>	<input type="text"/>
<input type="text"/>		
TAXONOMIC CODE		
SENDER Institution	<input type="text"/>	PERMIT # _____
	INSTITUTION CODE	
<i>(NAME)</i> _____		
<i>(ADDRESS)</i> _____		
RECIPIENT Institution	<input type="text"/>	PERMIT # _____
	INSTITUTION CODE	
<i>(NAME)</i> _____		
<i>(ADDRESS)</i> _____		
TRANSACTION DATE _____	TYPE OF TRANSACTION _____	
AGE/BIRTH DATE _____	SEX _____	BIRTHPLACE _____

3 PART:

- * Part one to be kept by sender institution
- * Part two to be kept by recipient institution
- * Part three to be sent to USDI and later forwarded to ISIS

Forms printed on NCR paper with third copy on postcard stock, stamped and addressed to the USDI on the reverse side.

APPENDIX IX

CONTENTS

1. Draft of testimony - "Status of Wild Mammal Species Held in American Zoos".
2. Introduction to three ISIS manuals:
 - (a) ISIS Institution Procedures
 - (b) ISIS Mammalian Taxonomic Directory
 - (c) ISIS World Geographic and Zoological Institution Directory.
3. List of participants in ISIS.
4. Four manuscripts as documentation for this presentation:
 - (a) ISIS: An Animal Census System
 - (b) ISIS - An Established Data Bank for Captive Wolves
 - (c) Gene Pool Conservation and Breeding Strategy for Zoos
 - (d) Long-Term Control of Reproduction in Female Lions (Panthera leo) with Implanted Contraceptives.
5. Current status report of ISIS - "ISIS - A Collecting and Sharing of Captive Animal Statistics". July 1, 1975

Jacobs 223-3800
Steele - 785-2130

Noah was instructed to construct an ark and bring aboard representatives of all the creatures of the earth, the skies, and the waters to provide a nucleus of survival during the period of the floods. At the conclusion of the floods, the instructions received were "Be fruitful, and multiply, and replenish the earth." The ark was stocked with seven pairs of each species brought aboard. This early wisdom in collecting a significant gene pool reflects, I am sure, the animal husbandry skills of these peoples at that time.

Modern day zoos are faced with the responsibility of developing self-sustaining populations of captive wild species and in selected instances of providing the only reservoir for species on the verge of extinction or extinct in the wild. To accomplish these goals it has been necessary to develop policies for management of the gene pools over multiple generations, to collect data and share it, to continue work on development of methods for enhancement of reproduction, and finally to develop methods for managing problems of surplus production.

Collection of census and vital statistics data are being accomplished by the ISIS committee of the American Association of Zoological Parks and Aquariums. Development of gene pool management concepts for development of a breeding policy and breeding management philosophy are currently underway. Enhancement of reproduction is being accomplished by development of innovative management techniques, behavioral and field studies, and in selected cases through the use of artificial insemination and hormonal manipulation. The problem of managing surplus has become acute with some species, including several on the U. S. list of endangered foreign mammals.

The first American Association of Zoological Parks and Aquariums (AAZPA) International Species Inventory System (ISIS) mammalian species distribution summary (our first national survey) was prepared May 5, 1975. It records data on 12,086 living specimens based on reports from 92 zoos, of whom 44 have completed their entire inventory reports, Tables 1-4. The report summarizes events occurring during the year 1974, thus, any births or deaths occurring during 1975 are not included. The report contains data on 12,086 living specimens of mammals, of which 1,944 were born in 1974, and 287 deaths were recorded. The 287 deaths represent only a proportion of the deaths occurring in 1974 since we did not begin collecting data until June 1974. Our instructions to the zoos requested they begin with their currently living collection and then report deaths and other changes as they occurred from their beginning date. This means that all animals born in 1974 and still living in the zoo would be recorded, whereas only about one-fourth of the year's deaths are on record. We, therefore, estimate that the actual number of deaths is around 1,144. More accurate data will be available at the end of 1975.

Thus, 16% of the 12,086 living specimens on record were born during 1974, and approximately 9% of a total 13,200 died during 1974. The total number of acquisitions during this period was 3,517 and includes the 1,944 births, 784 purchases, 165 trades, 414 donations, and 155 loans. During the same period 760 specimens were released or removed from the individual collections. This included the 287 deaths mentioned above and 249 sales, 74 trades and 88 loans. At the time of reporting, 157 autopsies were recorded for the 287 deaths, yielding an autopsy rate of 55%. This rate would increase with later autopsy reports as these become available, but even at this percentage is higher than the nation-wide rate of human autopsies.

12,086
1,144
13,230

Although it will be another six months before complete data are available to allow precise estimates of overall birth rates and death rates, it is already clear that the number of animals being born in zoo collections considerably exceeds the current death rate. This is the result of many successful breeding programs which are producing sufficient numbers of some species with the result that no additional space is available in qualified zoo collections for these animals. It also reflects the fact that the death rate for most species in captivity is considerably lower than that observed in the wild since zoo collections offer continuous adequate nutrition, treatment for disease and no predator pressure. Rather, a major consideration for future zoo breeding management policy will be carefully regulated breeding to maintain adequate genetic heterogeneity in the gene pools to be maintained in captivity primarily from captive stock. The data base provided by the ISIS program of the AAZPA will make a significant contribution to the achievement of these breeding policy objectives.

An example of the kind of information available to the zoos may be illustrated with our available data on an endangered species, the jaguar, Panthera onca. This species is currently considered to contain eight subspecies of which three are currently identified as being held in captivity. The following data are the actual numbers based upon the animals reported, that is 12,086. It is estimated that this represents one-third of the animals held in collections in North America. Since the sample size is so large and there are a wide spread of zoo exhibitors represented, we feel that a reasonable estimate of the actual numbers in each of the categories to be discussed can be obtained simply by multiplying by three. Thus, the total number of jaguars listed are 125, of which 111 are unidentified with respect to subspecies classification, and 24 are placed

in either Panthera onca centralis or Panthera onca onca, or Panthera onca arizonensis. These 125 animals are held in 42 zoos. The sexes are as follows: 66 females, 58 males, and 1 of unknown sex. Eleven of the zoos held animals of one sex only, for a total of 13, yielding 31 zoos with 114 animals in a potentially paired situation. During the time of record, 35 baby jaguars were born and 30 currently remain in these collections. There appear then to have been 13 litters born in 12 zoos, with two deaths occurring during the first 60 days. Thus, the 114 animals minus 30 born during the year yields 84 animals that might potentially be breeders. However, an additional 13 are less than two years old, yielding 71 animals of approximately breeding age. A survey of the data indicated 30 zoos with pairs of animals older than two years that might potentially produce young. Twenty-three of these zoos had pairs between the age of two and ten years, which produced a total of nine litters in eight of the zoos. Seven of the zoos had pairs greater than 10 years of age, which produced three litters. Thus, eleven out of 30 zoos produced a total of 12 litters for a total of 34 animals born. If one multiplies these numbers by three to arrive at an estimate of the total captive jaguar population in North America, the data indicate the presence of 375 animals and the probability that about 105 births occurred during the year 1974. The effective breeding population would be in the vicinity of 210 animals, with adequate recruitment to maintain this population and produce a surplus.

A similar analysis of four other endangered species, ringtail lemur (Lemur catta), black lemur (Lemur macaco), leopard (Panthera pardus), and tiger (Panthera tigris) has yielded similar results, Table 5. The success of American zoos in developing self-sustaining captive populations of species can be

demonstrated with data from five species on the U. S. list of endangered foreign mammals. These include the ringtail lemur, black lemur, jaguar, leopard, and tiger as summarized in Tables 5 and 6. The numbers of each of these species currently held in captivity ranges between 375 and 770 animals. Various estimates of the numbers required to maintain a viable population in captivity range between 100 and 300. Each of these species clearly exceeds these requirements. They are held in a large number of zoos ranging between 25 and 150, thus insuring protection against catastrophic loss due to disease or some other accident. Approximately 80 to 90% of the zoos holding these species hold breeding groups. There is a satisfactory distribution of sexes in the groups with a slightly greater proportion of females than males in most cases. The firmest indication of success of maintenance of these species is gained from comparisons of birth rates and death rates. The excess of births over deaths ranges from two to five fold in these species. The numbers of births are so large in each of the species that we are clearly able to enter into an exponential growth curve in numbers of specimens. The numbers of Siberian tigers held in captivity are greater than the numbers estimated presently to be existant in the wild. Indeed, currently approximately 200 animals are estimated to exist in the wild and during the year 1974 there were 130 births of Siberian tigers in captivity in American zoos. Further evidence of the security of the captive born populations is obtained from evidence that the majority of the animals currently held in captivity were born in captivity, thus second and third generation offspring have been produced with all of these species. The numbers of captive born for these five species range between 69

and 92%. The very success of these programs has generated its own problems. With the production of such large numbers there is generated the need to allow movement of these animals between zoos as readily as possible and to develop techniques for control of surplus breeding. There is, thus, an urgent need to develop the means of moving these animals more readily between qualified zoos in this country.

The control of reproduction would appear almost an inappropriate topic for discussion in light of the urgent need to define mechanisms for conservation of the many species on endangered and threatened lists. However, the very success of breeding programs has generated problems of animal surplus and disposal which must be met. Also, the establishment of a regulated breeding policy requires selective removal of animals from the active breeding population. This, however, may need to be done without removal of the specimen from the display, exhibit, or maintenance group. Also, undesirable genetic stock has to be removed from active breeding. The problem of a large available surplus has already occurred in captive populations of lions, tigers, leopards, and jaguars. Current programs of management and maintenance of these animals in groups with ample opportunities for breeding and their successful management has resulted in the production of far more young animals than can be carried in the facilities and has over-saturated available zoo facilities.

The suppression of reproduction can be accomplished by management techniques such as separation at appropriate times of the breeding cycle; by surgical techniques, most commonly castration or vasectomy of the male; and by use of contraceptives either mechanical or hormonal. We have assisted in the development of

a hormonal program for contraception on the basis of the need for reversible techniques, techniques which will minimize behavioral effects upon the animals, techniques which can be applied to males and to females, and techniques utilizing methods of administration requiring a minimum number of administrations of the compound to individual animals.

We have received requests from 13 zoos to participate in the contraception program for the big cats. Most of the zoos with successful breeding programs are now unable to dispose of their surplus and cannot responsibly allow further reproduction until the problems of distribution are resolved. The use of reversible contraception is a responsible approach to the problem.

The information summarized in this presentation documents the successful cooperative efforts of American zoos to develop and share census and vital statistics-information on wild species in their care. The resulting data have demonstrated the successful establishment of self-sustaining captive populations of many species including endangered species. Indeed, with leopards, tigers, jaguars, and lions it has become necessary to control reproduction in order to avoid an unmanageable excess. These events represent a nearly unanimous sustained cooperative effort by zoological exhibit institutions to make a unique contribution to the conservation of the world's wildlife.

ISIS ZOO INVENTORY ANALYSIS

Table 1A

SUMMARY BY MAMMALIAN ORDERS

1974

	<u>Specimens</u>	<u>Births</u>	<u>Recorded Deaths</u>	<u>Estimated Deaths</u>	<u>Sum of Aquisitions</u>	<u>Sum of Releases</u>	<u>Autopsies</u>
Monotremata	16	0	1		2	1	0
Marsupialia	417	73	12	(48)	170	16	6
Insectivora	83	16	5	(20)	30	7	1
Chiroptera	115	13	4	(16)	25	11	3
Primates	3006	277	56	(224)	617	127	42
Edentata	188	4	1	(4)	36	4	0
Dermoptera	0						
Pholidata	3	0	0	-	0	0	0
Lagomorpha	16	8	0	-	11	0	0
Rodentia	754	132	27	(108)	352	33	13
Cetacea	2	0	0	-	0	0	0
Carnivora	2888	478	48	(192)	934	203	25
Pinnipedia	142	1	4	(16)	29	5	3
Tubulidentata	5	0	0	-	3	0	0
Proboscidea	107	0	1	(4)	15	1	1
Hyracoidea	71	11	3	(12)	27	3	3
Sirenia	0						
Perissodactyla	432	31	5	(20)	76	25	1
Artiodactyla	3841	900	119	(476)	1190	323	55
	<u>12086</u>	<u>1944</u>	<u>286</u>	<u>(1144)</u>		<u>759</u>	<u>153</u>

ISIS ZOO INVENTORY ANALYSIS

Table 1B

SUMMARY BY MAMMALIAN ORDERS

1974

	<u>% of Mammals</u>	<u>Births as % of Sum</u>	<u>Births as % Aquis.</u>	<u>Deaths as % Sum</u>	<u>Ratio of Births/Deaths</u>
Monotremata	1 ³	0	0	-	-
Marsupialia	3.5	17.5	42.9	11.5	1.52
Insectivora	.7	19.3	53.3	24.1	.8
Chiroptera	1.0	11.3	52.0	13.9	.81
Primates	24.9	9.2	44.9	7.5	1.23
Edentata	1.6	2.1	11.1	2.1	1.00
Dermoptera					
Pholidata	.02	0	0	-	-
Lagomorpha	1 ³	50	72.7	-	-
Rodentia	6.2	17.5	37.5	14.3	1.22
Cetacea	-	0	0	-	-
Carnivora	23.9	16.5	51.2	6.6	2.50
Pinnipedia	1.2	.7	3.4	11.3	.06
Tubulidentata	.04	0	0	-	-
Proboscidea	0.9	0	0	3.7	0
Hyracoidea	0.6	15.5	40.7	16.9	.92
Sirenia					
Perissodactyla	3.6	7.2	40.8	4.6	1.57
Artiodactyla	31.8	23.4	75.6	12.4	1.89

ISIS ZOO INVENTORY ANALYSIS

Table 2A

SUMMARY OF PRIMATE FAMILIES

1974

	<u>Specimens</u>	<u>Births</u>	<u>Recorded Deaths</u>	<u>Estimated Deaths</u>	<u>Sum of Aquisitions</u>	<u>Sum of Releases</u>	<u>Autopsies</u>
Lemuridae	334	55	2	(8)	62	4	2
Indridae	7	2	0	(0)	2	0	0
Daubentoniidae	3	1	0	(0)	1	0	0
Lorisidae	204	21	3	(12)	51	8	0
Tarsiidae	5	0	0	(0)	2	0	0
Cebidae	644	37	10	(40)	154	14	10
Callithrichidae	192	47	8	(32)	72	13	6
Cercopithecidae	1119	93	24	(96)	195	65	19
Pongidae	493	21	9	(36)	78	23	5
Hominidae	5	-	-	-	-	-	-
	<u>3006</u>	<u>277</u>	<u>56</u>	<u>(224)</u>	<u>617</u>	<u>127</u>	<u>42</u>

ISIS ZOO INVENTORY ANALYSIS

Table 2B

SUMMARY OF PRIMATE FAMILIES

1974

	<u><i>Primate</i></u> % of Mammals	<u>Births as % of Sum</u>	<u>Births as % Aquis.</u>	<u>Deaths as % Sum</u>	<u>Ratio of Births/Deaths</u>
Lemuridae	11.1	16.5	88.7	2.4	6.88
Indridae	0.2	28.6	100.0	0	0
Daubentoniidae	0.1	33.3	100.0	0	0
Lorisidae	6.8	10.3	41.2	5.9	1.75
Tarsiidae	0.2	0	0	0	0
Cebidae	21.4	5.7	24.0	6.2	.93
Callithrichidae	6.4	24.5	65.3	16.7	1.47
Cercopithecidae	37.2	8.3	47.7	8.6	.97
Pongidae	16.4	4.3	26.9	7.3	.58
Hominidae	0.2	-	-	-	-

ISIS ZOO INVENTORY ANALYSIS

Table 3A

SUMMARY OF CARNIVORE FAMILIES

1974

	<u>Specimens</u>	<u>Births</u>	<u>Recorded Deaths</u>	<u>Estimated Deaths</u>	<u>Sum of Aquisitions</u>	<u>Sum of Releases</u>	<u>Autopsies</u>
Canidae	299	47	3	(12)	95	22	1
Ursidae	395	27	9	(36)	72	26	6
Procyonidae	230	14	1	(4)	65	9	1
Mustelidae	257	8	5	(20)	94	12	3
Viverridae	117	7	2	(8)	38	5	0
Hyaenidae	44	6	1	(4)	9	2	0
Felidae	1546	369	27	(108)	561	127	14
	<u>2888</u>	<u>478</u>	<u>48</u>	<u>(192)</u>	<u>934</u>	<u>203</u>	<u>25</u>

ISIS ZOO INVENTORY ANALYSIS

Table 3B

SUMMARY OF CARNIVORE FAMILIES

1974

	<u>Mammals</u>	<u>Births as % of Sum</u>	<u>Births as % Aquis.</u>	<u>Deaths as % Sum</u>	<u>Ratio of Births/Deaths</u>
Canidae	10.4	15.7	49.5	4.0	3.92
Ursidae	13.7	6.8	37.5	9.1	.75
Procyonidae	8.0	6.1	21.5	1.7	3.5
Mustelidae	8.9	3.1	8.5	7.8	.4
Viverridae	4.1	6.0	18.4	6.8	.88
Hyaenidae	1.5	13.6	66.7	9.1	1.5
Felidae	53.5	23.9	65.8	7.0	3.42

ISIS ZOO INVENTORY ANALYSIS

Table 4A

SUMMARY OF ARTIODACTYLA FAMILIES

1974

	<u>Specimens</u>	<u>Births</u>	<u>Recorded Deaths</u>	<u>Estimated Deaths</u>	<u>Sum of Aquisitions</u>	<u>Sum of Releases</u>	<u>Autopsies</u>
Suidae	11	4	0	(0)	4	0	0
Tayassuidae	44	10	1	(4)	11	3	0
Hippopotamidae	89	13	1	(4)	16	4	0
Camelidae	324	55	5	(20)	85	19	5
Tragulidae	3	-	-	-	-	-	-
Cervidae	1043	257	43	(172)	306	103	16
Giraffidae	105	15	2	(8)	29	3	2
Antilocapridae	37	10	5	(20)	19	6	4
Bovidae	2185	536	62	(248)	720	185	28
	<u>3841</u>	<u>900</u>	<u>119</u>	<u>(476)</u>	<u>1190</u>	<u>323</u>	<u>55</u>

ISIS ZOO INVENTORY ANALYSIS

Table 4B

SUMMARY OF ARTIODACTYLA FAMILIES

1974

	<u>Mammals</u>	<u>Births as % of Sum</u>	<u>Births as % Aquis.</u>	<u>Deaths as % Sum</u>	<u>Ratio of Births/Deaths</u>
Suidae	.3	36.4	100	0	0
Tayassuidae	1.1	22.7	90.9	9.1	.1
Hippopotamidae	2.3	14.6	81.3	4.5	3.3
Camelidae	8.4	17.0	64.7	6.2	2.8
Tragulidae	.1	-	-	-	-
Cervidae	27.2	24.6	84.0	16.5	1.5
Giraffidae	2.7	14.3	51.7	7.6	1.9
Antilocapridae	1.0	27.0	52.6	54.1	.5
Bovidae	56.9	24.5	74.4	11.4	2.2

STATUS IN AMERICAN ZOOS OF FIVE ENDANGERED SPECIES¹

<u>Species</u>	Estimates ²				
	<u>Number of Zoos Holding the Species</u>	<u>Number of Animals</u>	<u>Sex Ratio ♂/♀</u>	<u>1974 Births</u>	<u>1974 Deaths</u>
Ringtail Lemur (<u>Lemur catta</u>)	67	422	1/1.4	60	0
Black Lemur (<u>Lemur macaco</u>)	25	382	1/1.1	60	20
Jaguar (<u>Panthera onca</u>)	126	375	1/1.0	105	24
Leopard (<u>Panthera pardus</u>)	137	580	1/1.1	135	70
Tiger (<u>Panthera tigris</u>)	150	770	1/1.3	260	50

¹ As listed in the U.S. List of Endangered Foreign Mammals, Federal Register, Vol. 35, No. 233, Wednesday, December 2, 1970.

² These estimates are based upon our data collected from 40% of American zoos as of May 5, 1975. The actual numbers were multiplied by 2.5 to obtain the numbers presented in this table.

ACTIVE ISIS PARTICIPANTS

1975 FEE PAID & CURRENTLY SUBMITTING DATA*

TABLE 1-A

Mammals submitted (# on 76 report)	Birds submitted (# on 76 report)	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species dis	
							Akron Children's Zoo, Akron, Ohio
							Arizona - Sonora Desert Museum, Tucson, Arizona
							Assiniboine Park Zoo, Winnipeg, Manitoba, Canada
							Atlanta Zoological Park, Atlanta, Georgia
							Baltimore Zoo, Baltimore, Maryland
							Beardsley Zoological Gardens, Bridgeport, Connecticut
							Birmingham Zoo, Birmingham, Alabama
							Buffalo Zoological Gardens, Buffalo, New York
							Burnet Park Zoo, Syracuse, New York
							Caldwell Children's Zoo, Tyler, Texas
							Calgary Zoo and Natural History Park, Calgary, Alberta, Canada
							Chicago Zoological Park, Brookfield, Illinois
							Zoological Society of Cincinnati, Cincinnati, Ohio
							Cleveland Aquarium, Cleveland, Ohio
							Cleveland Zoological Park, Cleveland, Ohio (Metroparks)
							Cohanzick Zoo, Bridgeton, New Jersey
							Cole Park Zoo, Midland, Texas
							Columbia Zoological Park, Columbia, South Carolina (Riverbanks)
							Denver Zoological Gardens, Denver, Colorado
							Dreher Park Zoological Gardens, West Palm Beach, Florida
							Duke University Primate Facility, Durham, North Carolina
							Duluth Zoo, Duluth, Minnesota
							Erie Zoo, Erie, Pennsylvania
							Fort Wayne Children's Zoological Gardens, Fort Wayne, Indiana
							Fort Worth Zoological Park, Fort Worth, Texas
							Gladys Porter Zoo, Brownsville, Texas
							Glen Oak Zoo, Peoria, Illinois
							The Greater Baton Rouge Zoo, Baton Rouge, Louisiana
							Henry Doorly Zoo, Omaha, Nebraska
							Henry Vilas Park Zoo, Madison, Wisconsin
							Highland Park Zoo, Highland Park, Pittsburgh, Pennsylvania
							Hogle Zoological Garden, Salt Lake City, Utah
							Houston Zoological Gardens, Houston, Texas
							Jackson Zoological Park, Jackson, Mississippi
							Jacksonville Zoological Park and Society, Jacksonville, Florida
							Jardin Zoologique de Quebec, Quebec, Canada
							Kemper Zoological Park, Hattiesburg, Mississippi
							Kansas City Zoological Gardens, Kansas City, Missouri
							Lafayette Zoological Park, Norfolk, Virginia
							Lincoln Children's Zoo, Lincoln, Nebraska
							Lincoln Municipal Zoo, Lincoln, Nebraska
							Lincoln Park Zoo, Chicago, Illinois
							Los Angeles Zoo, Los Angeles, California
							Louisville Zoological Garden, Louisville, Kentucky
							Marriott's Great America, Gurnee, Illinois
							Mesker Park Zoo, Evansville, Indiana
							Miller Park Zoo, Bloomington, Illinois
							Milwaukee County Zoo, Milwaukee, Wisconsin
							Minnesota Zoological Garden, Apple Valley, Minnesota
							Montgomery Zoo, Montgomery, Alabama

Mammals submitted (# on 76 report)	Birds submitted (# on 76 report)	Paid 1974	Paid 1975	Paid 1976	1976 Inventory	1976 Species dis
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National Zoological Park, Washington, D. C.
 National Zoological Park Conservation Center, Front Royal, Virginia
 National Zoological Parks Office of Zoological Research, Washington, D.C.
 Natural Science Center, Greensboro, North Carolina
 New York Zoological Society, Bronx, New York
 New York Society's St. Catherines Survival Center, St. Catherine Island,
 Georgia
 Okalahoma City Zoo, Oklahoma City, Oklahoma
 Philadelphia Zoological Garden, Philadelphia, Pennsylvania
 Pocono Wild Animal Farm, Stroudsburg, Pennsylvania
 Portland Zoological Gardens, Portland, Oregon (Washington Park Zoo)
 Ralph Mitchell Zoo, Independence, Kansas
 Randolph Park Zoo, Tucson, Arizona
 Rio Grande Zoo, Albuquerque, New Mexico
 Roger Williams Zoo, Providence, Rhode Island
 Roosevelt Park Zoo, Minot, North Dakota
 St. Louis Zoological Park, St. Louis, Missouri
 St. Paul's Como Zoo, St. Paul, Minnesota
 The Salisbury Zoo, Salisbury, Maryland
 San Antonio Zoological Gardens, San Antonio, Texas
 San Diego Wild Animal Park, San Diego, California
 San Diego Zoological Garden, San Diego, California
 San Francisco Zoo, San Francisco, California
 Santa Barbara Zoological Gardens, Santa Barbara, California
 Santa Fe Community College Teaching Zoo, Gainesville, Florida
 Sedgwick County Zoo, Wichita, Kansas
 Seneca Park Zoo, Rochester, New York
 John G. Shedd Aquarium, Chicago, Illinois
 South Bend Zoo (Potawatomi Park) South Bend, Indiana
 Topeka Zoological Park, Topeka, Kansas
 Metro Toronto Zoo, West Hill, Ontario
 Tulsa Zoo, Tulsa, Oklahoma
 Turtle Back Zoo, West Orange, New Jersey
 Utica Zoo, Utica, New York
 Wild Canid Survival and Research Center, St. Louis, Missouri
 Wolf Park, Battle Ground, Indiana (formerly):
 (North American Predatory Animal Center, Doyle, California)
 (North American Wildlife Park Foundation, Inc.)
 Woodland Park Zoological Gardens, Seattle, Washington

Mammals submitted
(# on 76 report)

Birds submitted
(# on 76 report)

Paid 1974

Paid 1975

Paid 1976

1976 Inventory

1976 Species dis

TABLE 1-B

ACTIVE ISIS PARTICIPANTS
CURRENTLY SUBMITTING DATA/1975 FEE NOT PAID

African Lion Safari, Rockton, Ontario, Canada
 Buttonwood Zoo, New Bedford, Massachusetts
 Dallas Zoo, Dallas, Texas
 Detroit Zoological Park, Royal Oak, Michigan
 Dickerson Park Zoo, Springfield, Missouri

Reports submitted
 (# on 76 report
 Birds submitted
 (# on 76 report
 Paid 1974
 Paid 1975
 Paid 1976
 1976 Inventory
 1976 Species di

TABLE 1-C

ACTIVE ISIS PARTICIPANTS

1975 FEE PAID/NOT CURRENTLY SUBMITTING DATA

- African Lion Safar, Port Clinton, Ohio (International Animal Exchange)
- Alexander Lindsay Junior Museum, Walnut Creek, California
- Boston Zoological Society, Dorchester, Massachusetts (3 Zoos)
- Busch Gardens, L. A., Van Nuys, California
- Crandon Park Zoological Garden, Key Biscayne, Florida
- Ellen Trout Park Zoo, Lufkin, Texas
- El Paso Zoological Park, El Paso, Texas
- Endangered Wildlife Research Program, Patuxent Center, Laurel, Maryland
- Gilbert, Mr. and Mrs. Frank H., Phoenix, Arizona
- Knoxville Zoological Park, Knoxville, Tennessee
- Las Vegas Valley Zoo, Las Vegas, Nevada
- Mystic Marinelife Aquarium, Mystic, Connecticut
- National Marine Fisheries Service Aquariu, Woods Hole, Massachusetts
- North Carolina Zoological Park, Asheboro, North Carolina
- Roeding Park Zoo, Fresno, California
- Sacramento Zoo, Sacramento, California
- Snyder's Darien Lake Zoo, Corfu, New York
- Vancouver Public Aquarium, Vancouver, British Columbia
- World Wildlife Safari, Winston, Oregon

Participants submitted
 (# on 76 report)
 Birds submitted
 (# on 76 report
 Paid 1974
 Paid 1975
 Paid 1976
 1976 Inventory
 1976 Species dis

TABLE 2-B

INACTIVE ISIS PARTICIPANTS

1975 FEE NOT PAID/NOT CURRENTLY SUBMITTING DATA

- Audubon Park, New Orleans, Louisiana
- Cen-tex Zoo, Waco, Texas
- Columbus Zoological Gardens, Powell, Ohio
- Elmwood Park Zoo, Norristown, Pennsylvania
- Great Plains Zoo, Sioux Falls, South Dakota
- Lee Richardson Zoo, Garden City, Kansas
- Opryland, U. S. A., Nashville, Tennessee
- Southwest Zoo-ogical Gardens, Mangum, Oklahoma
- Trailside Museums, Bear Mountain, New York

Mammals submitted
 (# on 76 report)

Birds submitted
 (# on 76 report)

Paid 1974

Paid 1975

Paid 1976

1976 Inventory

1976 Species dis-

TABLE 2-C
 INACTIVE ISIS PARTICIPANTS
 DROPPED FROM SYSTEM

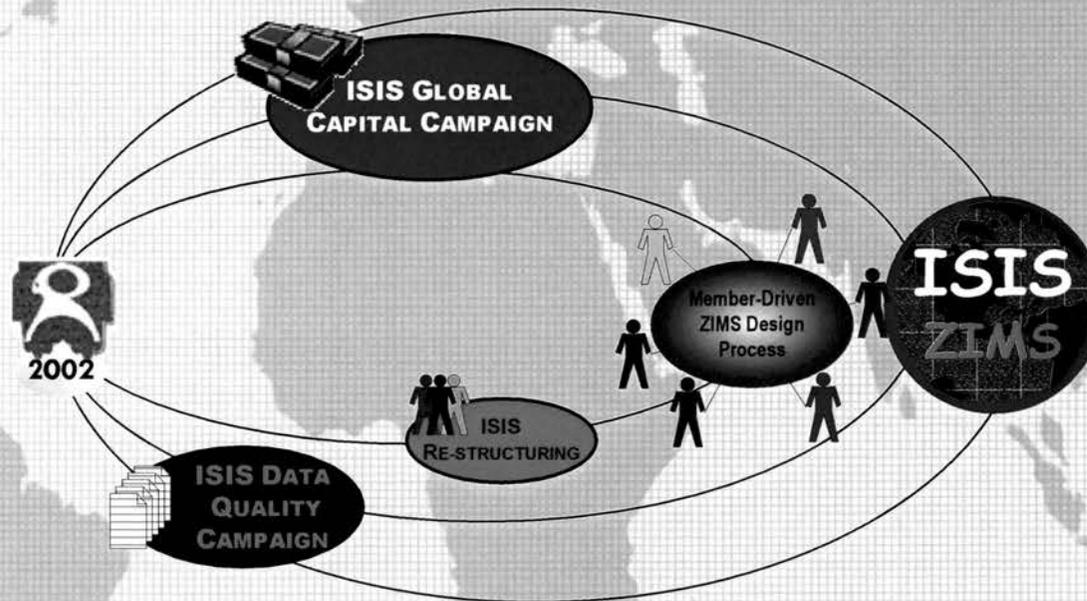
- Abilene Zoological Gardens, Abilene, Texas
- Brookgreen Gardens, Murrells Inlet, South Carolina
- Dakota Zoological Society, Inc., Bismarck, North Dakota
- City Park Zoo, Iowa City, Iowa
- Granby Zoological Society, Granby, Quebec, Canada
- Indianapolis Zoological Society, Inc., Indianapolis, Indiana
- Jungle Larry's African Safari, Naples, Florida
- Knowland Park Zoo, Oakland, California
- Long Island Game Farm, Inc., Manorville, New York
- Okanagan Game Farm, Penticton, British, Columbia
- Overton Park Zoo and Aquariu,, Memphis, Tennessee
- The Phoenix Zoo, Phoenix, Arizona
- T. Rowell, Primate Research, Univ. of California, Berkeley, California
- Storyland Valley Zoo, Edmonton, Alberta, Canada
- Warner Bros, Jungle Habitat, West Milford, New Jersey
- The Wildlife Preserve, Largo, Maryland

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ISIS: The Road to ZIMS



Introduction

In partnership with major regional zoo and aquarium associations around the world, and led by our members, ISIS is taking steps that will dramatically transform animal and collection management in zoos and aquariums worldwide.

The Future of ISIS. For the last three years ISIS has worked toward a clear future, set by 25 international ISIS stakeholders at the ISIS Futures Search 2000: One, Global, Accurate, Comprehensive, Real-time, Web-based Specimen and Collection Information System. This is an inspiring future, which will truly serve more than 600 ISIS member institutions, by greatly improving their ability to manage valuable live collections. To reach this future, we are going down several different paths at the same time:

1. ISIS will develop and support ZIMS,

the Zoological Information Management System, as the future generation of ISIS software. Initial design work for ZIMS was initiated by AZA, working with consultants at Inteq, Inc. ZIMS will now be developed globally by ISIS in partnership with AZA and other regions worldwide. ZIMS is the system recommended by the ISIS Futures Search 2000.

2. ISIS is re-structuring

(Board, Bylaws, Committees, internal organization, training and support, fees) in order to have the capacity to (a) facilitate further stages in the ISIS-member-driven ZIMS design process, (b) manage the major (outsourced) ZIMS software development project, and (c) provide support and training for ZIMS when it is released. The member-elected ISIS Board of Trustees, which now includes representatives of AZA, ARAZPA, EAZA, and PAAZAB, is overseeing these essential transformations.

3. ISIS is fund-raising

to find the considerable resources needed for ZIMS (US\$10 million estimated for the core inventory and veterinary modules, with a modern "data warehouse" replacing the current ISIS pooled database). We are in the early "friends and family" stages of this fund-raising, aided by consultant Benefactor's Counsel, Inc.

4. ISIS Members are "cleaning up" the data.

Now one year into a major ISIS-led Data Quality Campaign, members are "cleaning up" their animal records data. Data quality has improved by an impressive 25%, according to the first measure, "link" rate. This has immediate benefits for everyone, and also means that when ZIMS is "loaded" with institutional records data, ZIMS will provide higher-quality information for all. ISIS' current Windows ARKS 4 software now interacts with the ISIS web site in "client server" mode, to assure consistent data when specimens move, and to reduce data entry effort.

5. ISIS' membership continues to grow,

which is essential to provide comprehensiveness. This growth means adding new institutional data, which means more complete specimen histories and pedigrees, better coverage of regions, improved information services for both institutional and coordinated collection management. ISIS membership is currently expanding most rapidly in Europe, where the ISIS branch office and close cooperation have led to major expansion.



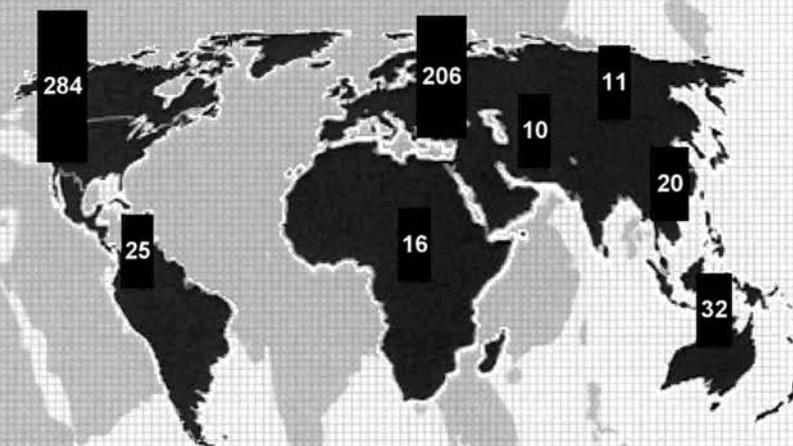
Membership Growth Continues

73 New Members Join ISIS in 2 Years

Jan 2001 - Dec 2002

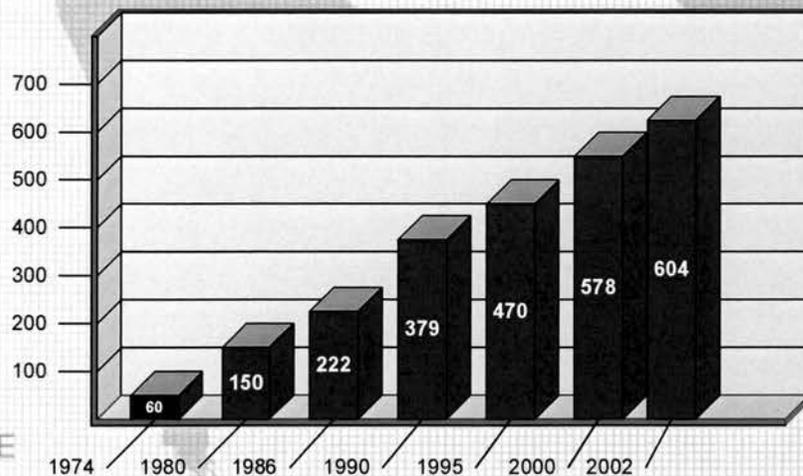
- 42 new members in European region
- 14 new members in North American region
- 9 new members in Central & Latin American regions
- 4 new members in Asian region
- 3 new members in African region
- 1 new member in Australasian region

ISIS Membership Distribution by Region as of Dec 2002



History of ISIS Membership Growth

28-year time span



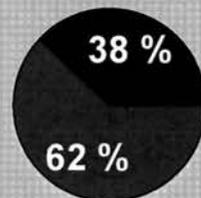
Regional Zoo Associations on several continents continue to strongly encourage their members to join ISIS. This is a major contribution to improving ISIS' coverage and therefore providing more comprehensive information to members, studbooks, species management, TAGs, collection planning, and external regulatory bodies.

Success of Data Quality Campaign

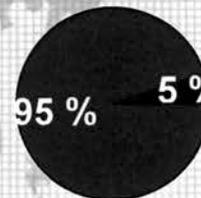
1. LINK together fragmented specimen histories

The animal records for 23,000 specimens have been newly linked together because of animal records data quality work by ISIS members during 2002. Over all historical data, the link rate increased from 48% to 62%. This is a 25% relative increase in ISIS data quality. The first year of the ISIS Data Quality Campaign is a success - thanks for the hard work!

More work remains to be done, but ISIS members have substantially improved the quality of the animal information now available to curators, keepers, studbooks, species managers, TAGs, collection planners, and data submitted to support permit requests. This "cleaned up" institutional data will make the investment in the next generation information system, ZIMS, far more worthwhile.



**Global
Transaction
Link Rate**
as of Jan 2003



**Global Valid
Parent Rate**
as of Jan 2003

2. Validate Sires and Dams

95% of all recorded sires and dams pass all data checks. Of the other 5%, half are simply not recorded as individuals in the ISIS database, the other half have inconsistent sire or dam data.

3. Compare Institutional Records to Studbook Records

Help Both To Reconcile Differences

To move to one database, we must look for and resolve any important differences between the institutional records and studbook records for the same specimen.

Tools to identify differences, and help members and studbook keepers resolve them, are under development at ISIS.

Sex Discrepancies.		
7 / AZA	sex: Male	8652 / CHICAGOLP
T1035 / AZA	sex: Male	663631 / OKLAHOMA
T1121 / AZA	sex: Female	104748 / CALGARY
T1149 / AZA	sex: Male	MM0720 / CLEVELAND

Studbook Specimen
International Species Information
Names:
Taxonomic: Gorilla gorilla gorilla
Birth Information:

Specimen Report
International Species Information
Names:
Taxonomic: Gorilla gorilla gorilla
Birth Information:



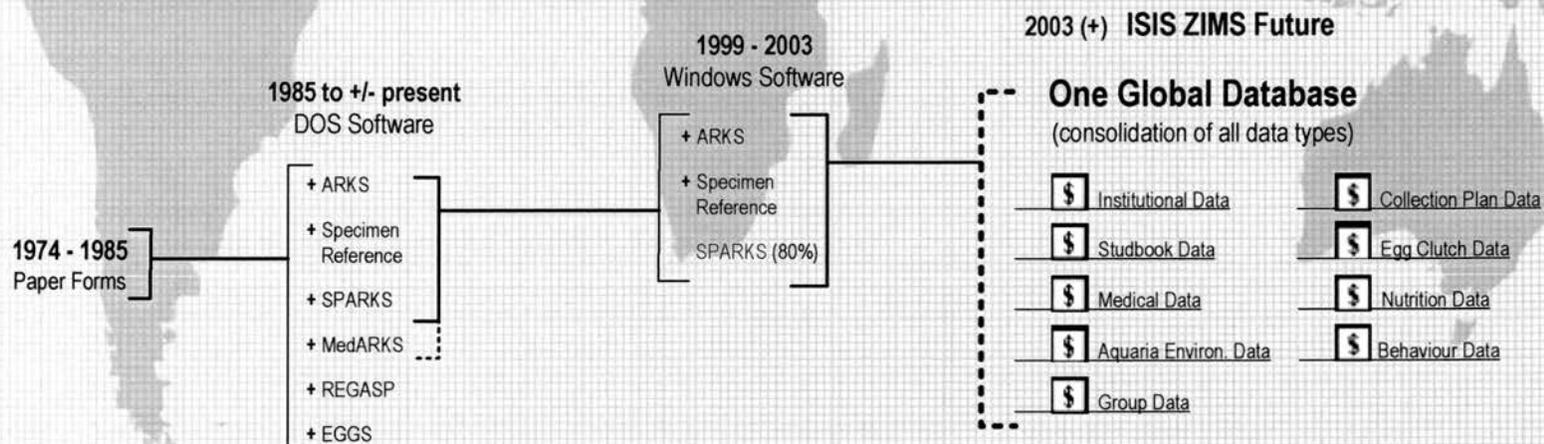
State of ISIS Systems for Members

Migrating from numerous separate, stand-alone databases (ARKS, SPARKS, MedARKS, REGASP, EGGS)
to **One Integrated Global Database (ZIMS)**.

Overview



More Detailed View



ISIS: Planning the New ISIS

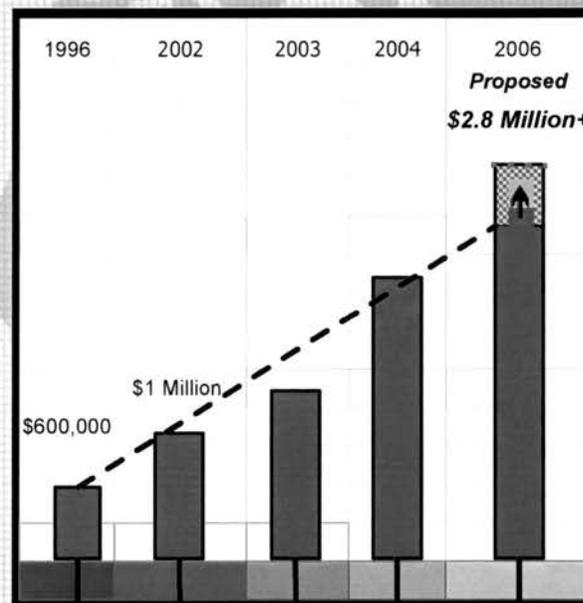
More capacity and services require more resources

ISIS operates a global information system serving more than 600 institutions, currently on ~ \$1 million USD annual operating budget. Since ISIS started in 1974, ISIS fees have never covered the costs of modernizing information systems when technology changed, as it has four times in this interval. Instead, ISIS has relied on 75 funded grants from foundations, government agencies, zoo associations, etc., to cover the costs of needed new systems. This has saved ISIS members some costs, but it has delayed progress until we could find someone else willing to pay for it.

Now, today's web-based technology offers our community major opportunities to improve management of living collections, and to modernize member's internal processes. We must help members make their institutional staff more productive and more efficient. Also, we must provide modern information systems for veterinarians, studbook keepers, and others, who are still using DOS-based technology, which is several generations out of date, very inefficient, and has a short life expectancy.

The ISIS Board of Trustees set up an *ad hoc* ISIS Operations Planning Committee, including representatives from several regions plus IT experts from inside and outside our community. This committee met for three full days in December 2002, and made many recommendations for a major re-structuring of ISIS.

ISIS as ZIMS Administrator & Host



The ISIS Board of Trustees has adopted many of these recommendations, implementing as many as possible in ISIS' 2003 budget. ISIS is now hiring a Chief Technology Officer/Project Manager, to oversee technology strategy and manage the development of ZIMS. ISIS is re-organizing its support and training efforts, and adopting new web-based support and training tools. Further changes are underway or will be as soon as resources permit.

The recommendations noted that ISIS has been under-staffed and under-funded and that this must change.

To continue to serve its members, ISIS must expand and strengthen its staff, and make continued investments in modernizing information systems. This will cost more, but benefit members far more.

The ISIS Board is currently evaluating changes to ISIS Membership Fees.

Proposed Increases In ISIS Operating Budget and Staff Resources

Past ISIS Operating Budgets

Exec.		
Mgr.		Mgr.
FT Staff	FT Staff	FT Staff
FT Staff	PT Staff	PT Staff

Exec.		
Mgr.		Mgr.
FT Staff	FT Staff	FT Staff
FT Staff	FT Staff	FT Staff
PT Staff	PT Staff	PT Staff
PT Staff	PT Staff	PT Staff
Branch		Branch

Exec.			
Mgr.	Mgr.	Mgr.	Mgr.
Mgr.	FT Staff	FT Staff	Mgr.
FT Staff	FT Staff	FT Staff	FT Staff
FT Staff	FT Staff	FT Staff	FT Staff
FT Staff	FT Staff	FT Staff	FT Staff
FT Staff	PT Staff	PT Staff	FT Staff
Branch			Branch

2002: First Steps to the Future

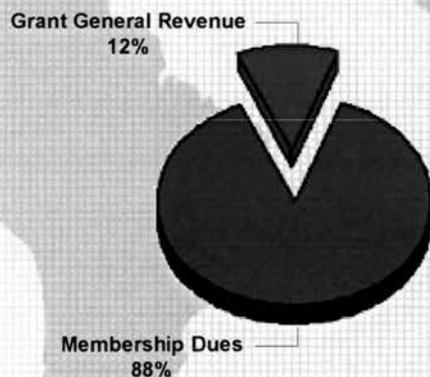
During 2002, ISIS was completing the development of CMS / ARKS4 as planned. Client/server functionality was implemented so that this desktop software application could download specimen data from the global database on the ISIS web site. This is especially important for new specimen acquisitions so the animal data is recorded consistently across different institutions.

A major, on-going activity is development of newer, smarter, data quality tools. These tools are serving an important role as ARKS software users review their animal collection data and clean-up data problems and discrepancies. This has immediate major advantages, and even more benefits as we prepare to move this higher quality data to ZIMS.

An important planning step was taken in December of 2002, with zoological and corporate technology experts advising ISIS on internal restructuring and strategic planning for development and deployment of ZIMS. The implications for future budgets (and membership fees) are being developed in the new ISIS. More details about this will be available in the ISIS Business Plan, to be published in the 2nd quarter of 2003.

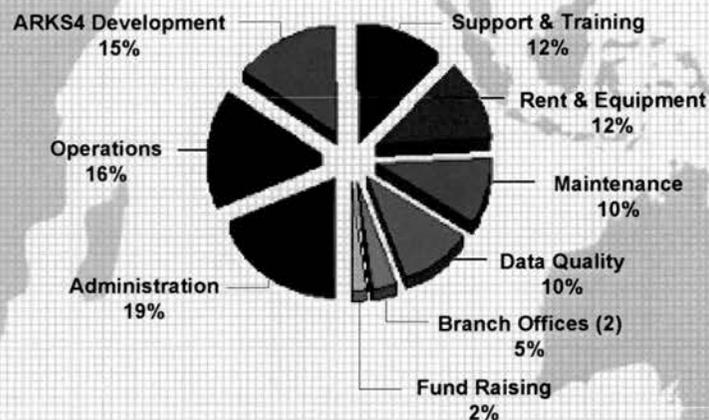
ISIS Income 2002

\$1,013,000 USD



ISIS Expenses 2002

\$979,600 USD



2003 Projections

The ad hoc ISIS Operating Planning Committee Recommendations were considered by the ISIS Board, many have been adopted, and implemented as much as current resources allow in the 2003 ISIS budget.

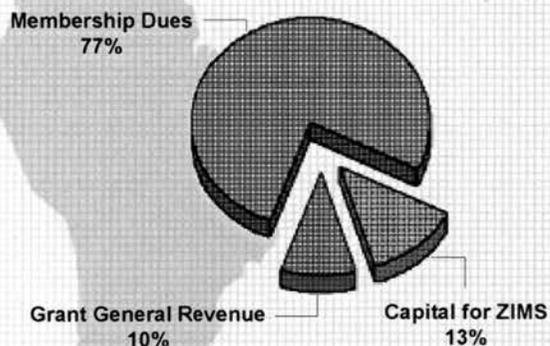
ISIS 2003 budget adds 2 professional staff to support ZIMS development (funded by ISIS' ZIMS Capital Campaign), and re-allocates other resources to increase support and training. Further development of current ISIS software will be focused on data quality support tools, to help members make their data ready for ZIMS.

With current systems becoming obsolete, and inadequate resources to upgrade to today's technology, it has become obvious to many that ISIS needs significantly more resources. Proper management of our live collections is an essential part of the business of zoos and aquariums.

Investment at levels similar to modern membership systems, accounting systems, and human resource systems is necessary and reasonable - even though it has not happened in the past.

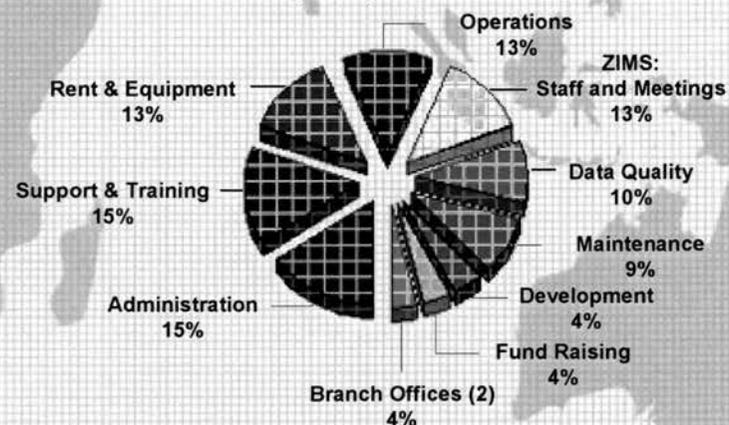
ISIS Projected Income 2003

\$1,170,000 USD



ISIS Projected Expenses 2003

\$1,170,000 USD



ISIS Capital Campaign

ISIS has launched a Capital Campaign to raise the substantial sum (est. US \$10 Million) needed for phase one of ZIMS, which would replace and dramatically improve the functionality of ARKS, MedARKS and SPARKS. We have hired fund raising professionals (Benefactor's Counsel, Inc.).

The campaign, led by ISIS Campaign Committee Chair Jeff Bonner, with European co-chairs Lars Lunding Andersen (Copenhagen) and Jo Gipps (Bristol), is in the "friends and family" first stage. The plan is to raise US \$4 million in pledges from the zoo and aquarium community, and with this in hand as evidence of our serious commitment, raise the remainder from corporate sponsors and grant sources. The campaign is going well. Be ready to respond to a call to support this community effort.

