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COLUMBIA RIVER COORDINATED INFORMATION SYSTEM

REPORT ON INFORMATION NEEDS

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PREFACE

Successful application of adaptive management to rebuilding the Columbia Basin's anadromous fish resources requires that available information and experience be organized and shared between numerous organizations and individuals. Past experience and knowledge must form the basis for actions into the future. Much of this knowledge exists only in unpublished form in agency and individual files Even that information which is published in the form of technical and contract reports receives only limited distribution and is often out of print and unavailable after a few years. Only a small fraction of the basin's collective knowledge is captured in permanent and readily available databases and recognized journals.

State, tribal, and federal fishery managers have recognized these information management problems and have committed to a program, the Coordinated Information System Project, to capture and share more easily the core data and other information upon which management decisions are based. That project is now completing the process of scoping and identification of key information needs. Construction of prototype systems will begin in 1992.

No comments were received on the final draft report circulated in April. Changes have been made to the draft report, however, to correct errors identified by the authors and during an editorial review. The CIS project anticipates a periodic reassessment of user information needs to keep the project focused on the most useful information. Written comments on this or other aspects of the project are appropriate at any time and will be incorporated in future updates.

This report is one in a series of seven describing the results of the Coordinated Information System scoping and needs identification phase. A brief description of each of these reports follows.

CIS Phase II Products:

Phase II Summary Report:

This report summarizes and integrates the results of the next five reports and relates them to deliverables identified in the Phase II cooperative agreement. Broader issues of organization and operation which are not appropriate for the more focused reports are also discussed. This report should be viewed as an executive summary for the CIS project to date. If one wants a quick overview of the CIS project, this report and the project plan will provide that perspective.

Report on Information Needs:

This report identifies the core information **needed to manage** and restore anadromous fish as determined by several methods. This information has been organized into various categories and missing items are identified. Prototype testing in 1992 will focus on this core information.

Data Catalog Report:

This report might be thought of as a "yellow pages" directory describing relevant numeric data available throughout the basin. An easily searched electronic version will be developed during prototype development and the catalog will be maintained and expanded.

Technical and Administrtive Options Report:

This report Describes **feasible** hardware, software, and operational options for implementing a CIS. Recommendations are made for the prototype and implementation phases of the project.

Reference Service Options Report:

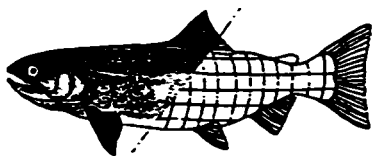
This report describes options for the size and operational features for the non-numeric portion of the CIS. Recommendations are made for the prototype and implementation phases.

Stock Assessment Reports:

These reports will be issued in separate volumes for Oregon, Washington, and Idaho at various times throughout this summer. The reports contain basic biologic information on all known anadromous fish populations in the Columbii Basin. This information will be incorporated into computerized data bases during prototyping and implementation.

Project Plan:

The Project Plan is derived directly from the Recommendations listed in the above Reports. It will be available in June, 1992 and will describe anticipated activities, staff needs, and cost of the project for the testing and impletientation phases.



EXECUTIVE SUMMARY

Of the approximately 300 surveys distributed, 144 or 48% were completed and returned. Data were entered into an electronic database using custom software. Results from the General, System, Natural Production and Hatchery Production Sections were summarized and presented individually. Results were also stratified according to the respondents level of responsibility (Policy, System Technical and Subbasin Technical.)

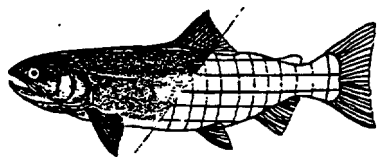
Results from the General Section indicate there does not appear to be a "typical" respondent. Because of the cross section of individuals surveyed, there was considerable diversity with regard to the types and sources of data accessed, as well as the methods by which they were accessed. There was consistency in the type of computer used; almost everyone responded that they use an IBM compatible computer, and most of them had a modem. Beyond that, however, there was little consistency regarding software used, methods of accessing data, etc. Survey respondents indicated a need for a delivery system that is easily used, accessible and timely with documentation that permits evaluation of data items and sets.

Responses to the System Information Section indicated that this type of information is generally considered to be in the "critical" to "important" range and is generally thought to be inadequate and/or incomplete. These results reflect the difficulty involved in estimating many system parameters, regardless of their importance and the amount attention they receive. System information that is in existence is largely unavailable often occurring in grey literature and, more often, in the files of researchers or former researchers.

Natural production and habitat data can also be characterized as data which are important or critical and generally inadequate or incomplete. High gap indices were estimated for data items necessary for estimating production potential, particularly survival to various life-stages. Also important were data items related to estimating the impact of hatchery fish on natural stocks. For data pertaining to natural production and habitat to be useful will require a reasonably large, sophisticated delivery system.

For Hatchery Production data the greatest gap indices were for data items related to hatchery fish during the phase when they are loose in the environment rather than in the hatchery. Included in the list were such data items as smolt outmigration survival rate and smolt to adult survival rate. Another principal area of concern was information related determining the genetic integrity of a given stock such as electrophoretic information. Although a considerable amount of hatchery production information is available, and much of it is contained on electronic media, there is little in the way of consistency or coordination among various data sets.

Data needs identified by potential CIS users corresponded quite closely with incompletely delined System Monitoring and Evaluation Program data needs. That program has not been fully defined by the Northwest Power Planning Council. It is presently being rethought by the Council during the present program amendment cycle. The information needs identified in this report will, in all likelihood, fit any future evaluation plan quite well.



SECTION I: DATA NEEDS

INTRODUCTION

The total body of anadromous fish information is a strategic resource upon which we base decisions regarding policies, plans, projects, and actions. These decisions cannot be improved unless we first improve the information base. Such improvement should proceed in four steps. First, the information needed for sound assessment and decision must be identified. Second the information must be assembled and organized into a useful format. Third, the information must be communicated to those interested and involved in the decision process. A shared understanding of the resource is essential for making wise choices from a range of options on almost every issue. Finally, the information base must be reevaluated as knowledge grows and issues change and modified to remain responsive to decision needs.

Knowledge about Columbia River anadromous fish populations is accumulated and stored in three forms. Perhaps the most familiar is information in its written form. This consists of quite a range of formats from technical research reports on the one hand, through newspaper and magazine articles in the popular press, to personal notes and- files kept by individuals. This material includes text, graphs and pictures, tables of various sorts, and field notes and observations. Written information usually represents an individual's synthesis of many small bits of information into an explanation of a larger problem or phenomenon and can be the result of many days or years of accumulated skills and effort.

Information is also commonly expressed as numbers. These are composed of such things as counts of fish abundance, measurements of attributes such as length and weight, and calculated values such as survival or growth rates. Numeric information can conveniently be stored in electronic databases for quick sorting, retrieval, or graphing. Much numeric information is also stored on paper in various reports and files and is not in. an electronic form. This information is the base upon which sound technical hypotheses and conclusions are built and reported in written form.

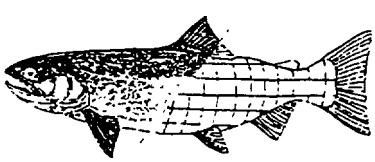
The third, and equally important, form of knowledge might be characterized as ephemeral information. This resides in an individual's mind and represents what that person understands, remembers, and knows about particular topics. It may also be recorded in written or numeric form, but is accessed from the memory. Ephemeral information is most often transmitted verbally, either in conversation, formal presentations, or via radio or television.

Ephemeral information can be easily lost in several ways. Over time, individuals forget what they have heard, read, or experienced. When individuals cease to participate in an

activity, for example by changing jobs, retirement, or death, their experience and knowledge are lost to their colleagues unless it has been recorded in some form. Finally, even recorded information can become ephemeral if records are lost, destroyed, or cannot be easily accessed.

This report identifies basic information needed to understand and manage Columbia Basin anadromous fish resources. Information was identified both from existing Northwest Power Planning Council documents and committee reports and from statements of professionals involved daily with fishery issues. The main focus at this time was on written and numeric information, although a number of individuals identified certain ephemeral information as also being important.

Terminology for these sets of information is not precise, and the reader should understand that overlap is inevitable. Written, text, or reference information, generally means the recorded, non-numeric information available. This material is voluminous and not as easy to manipulate and manage as numeric information. Obviously, numeric information also exists in written form and should be identified within a referencing system. The distinction we make is that numeric information can usually be stored, made available, and manipulated using well developed database technology. We hope the context will clarify any ambiguous terminology.



METHODS

User Needs

The data and communication needs regarding anadromous salmonids in the Columbia River Basin were acquired by means of a survey initiated in July, 1991. This survey (Appendix A) contained four sections: General Information, System, Natural Production and Hatchery Production. The General Information Section was designed to gather information about the respondent's position within the region and the methods by which he or she communicates information and shares data. The System Information Section was directed toward those with a system perspective and was intended to query the respondent as to the availability of passage, harvest and other data useful for making system-wide assessments. The Natural Production Section was directed toward information on the habitat quality, carrying capacity and survival of natural fish and the Hatchery Production Section dealt with all aspects of artificial propagation, including supplementation.

All respondents were asked to complete the General Information Section, including the concluding remarks, and at least one of the other three sections. For each data item in any of the sections, the respondent was asked to enter a two character code, the first character of which indicated the importance of the data item where:

1 = helpful
2 = important and
3 = critical

The second character indicated the level of adequacy and availability where:

A = adequate and available
I = inadequate or incomplete and
M = missing altogether

The respondent was also asked if he or she is a collector or contact person for that particular data item. This question, although not necessary for the needs part of the survey, was designed to build the data item directory component of the data catalog.

Surveys were conducted by CRITFC, IDFG, ODFW, WDF and WDW. Surveys were either mailed or hand delivered to individuals that were identified as having expertise in one or more of the areas (sections) covered in the survey. They were asked to complete the parts in which they had some expertise rather than being compelled to complete the entire survey.

All responses were entered onto a data base using custom software. For each of the three information sections (System, Natural and Hatchery), the summary tables that appear in the text of the report present results in terms of indices rather than in the form of the raw data.

There were three indices developed for each data item in the survey, a Criticality Index (CI), an Availability Index (AI) and a "Gap" Index (GI) which is a measure of the disparity between a data item's criticality and its availability. The Criticality Index (CI) was the sum of the scores (1, 2 or 3) divided by the number of responses to each particular data item. The CI could range from 1.0 to 3.0, where a high score indicates a high level of criticality.

The Availability Index (AI) was generated by assigning a "one" to each Missing entry, a "two" to each Inadequate entry and a "three" to each Adequate entry and then summing the entries and dividing by the number of responses. The AI could range from 1.0 to 3.0, where a high score indicates a high level availability or adequacy.

The Gap index (GI), created to provide a measure of the disparity between the criticality of a data item and its availability, is simply the Criticality Index divided by the Availability Index. The GI can range from 0.33 to 3.0, where the higher the score the higher the disparity.

The three indices (Criticality, Availability and Gap) were used in tables that appear in the text of this report to summarize information. More detailed information is included as appendices to this report. In addition, appendix information includes results stratified by level of responsibility (policy, system technical and subbasin technical).

SMEP Needs

A major purpose of Phase II of this project was to clearly identify "information needed to plan, monitor, and evaluate actions pursuant to the Fish and Wildlife Program with particular emphasis on SMEP (System Monitoring and Evaluation Program)" (parentheses added). At the time the present agreement was negotiated (November, 1990) the SMEP program was under development. It has yet to be completed by the Northwest Power Planning Council and this project had only a few draft tables to work from.

SMEP needs were, for the purposes of this project, defined as any information needs described in Council documents. Of particular importance were available draft SMEP tables, parameters used in the System Planning Model, and reports from a series of Council sponsored genetic workshops. These reports were developed by Power Council instituted groups that were formed for the purposes of monitoring and evaluation (System Monitoring and Evaluation, SMEP), assessment (System Planning Model, SPM; Stock Assessment Report, SSR) and genetic risk evaluations.

RESULTS

Survey Response

A survey was used to determine user needs, data collected, and other general comments. In mid-July over 300 surveys were sent to people identified as being involved with anadromous fish issues in the Columbia River Basin. As of the end of August 1991 a total of 144 surveys had been received for a return rate of 40%. Results indicate that all areas of anadromous fish work were represented (Figures 1.1 and 1.2). It should also be noted that in some cases a returned survey represented the collective responses of more than one individual, such as a particular office: consequently, the total number of respondents is greater than the total number of surveys returned. In addition some questions were worded such that more than one answer was possible (e.g., biologists may have positions in which they do both planning and research).

Based upon answers to certain questions and surveyor familiarity with those surveyed, people were stratified according to their participation level. Levels included policy, system, and subbasin. Many respondents participate at multiple levels. In such cases policy took precedent over system which, in turn, took precedence over subbasin, Of the total number of respondents, 19% of the people spent at least part of their time dealing with policy issues. People working on a system or subbasin level accounted for 44 % and 37% of the respondents, respectively (Table 1. la, Figure 1.3a).

Those surveyed were also stratified by their employing entity. People were classified as working for either federal, state, or tribal government, or other entity (e.g., university, consulting firm, private industry, public utility, irrigation district). Almost three out of five respondents worked for a state government. Twenty-seven percent worked for the federal government and 7 % each for either a tribal or other organization (Table 1. lb, Figure 1.3b).

Almost three out of every four (72%) people reported that they collect, maintain or are the contact for some kind of data. Data on natural production (38%), habitat (32%), and hatchery production (28%) was the information most collected as indicated by the surveys returned (Figure 1.4).

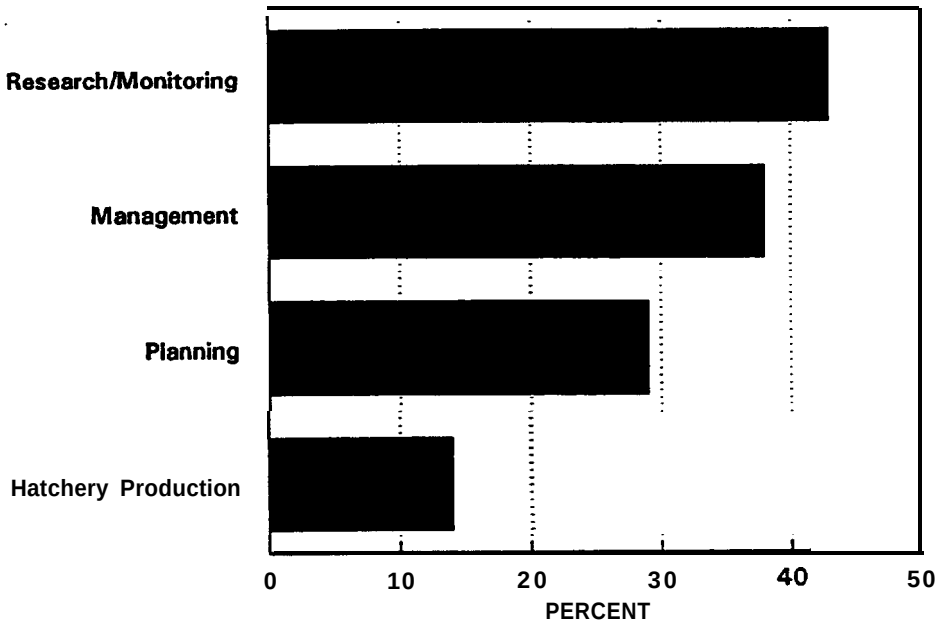
One purpose of the survey was to discover how data are reported and accessed. Sixty-five percent of the surveys returned indicated that data are reported via annual reports (Table 1.2). Other popular methods of reporting data included internal agency files, personal conversations, and professional meetings. Annual reports were the most frequently (78%) used method in which people accessed other's data, followed by internal agency files,

internal agency databases, and personal conversations (Table 1.2).

FIGURE 1.1

Is your current position primarily:

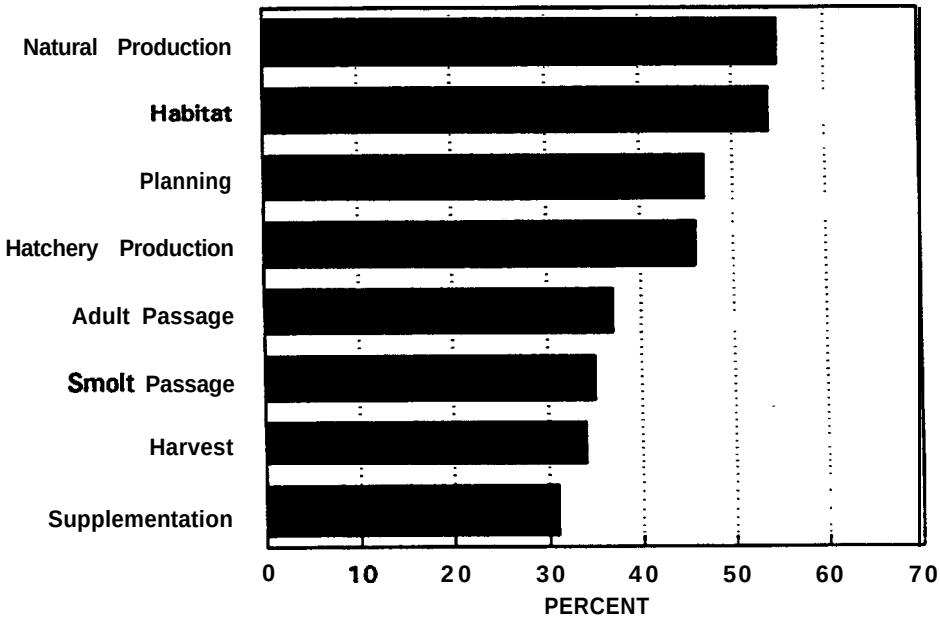
(n = 1331



Note: Some respondents checked more than one position category.

FIGURE 1 3

In which of the following anadromous areas have you worked? (n = 138)



Note: Respondents were allowed to check more than one answer.

FIGURE 1.3a
Respondents by participation level

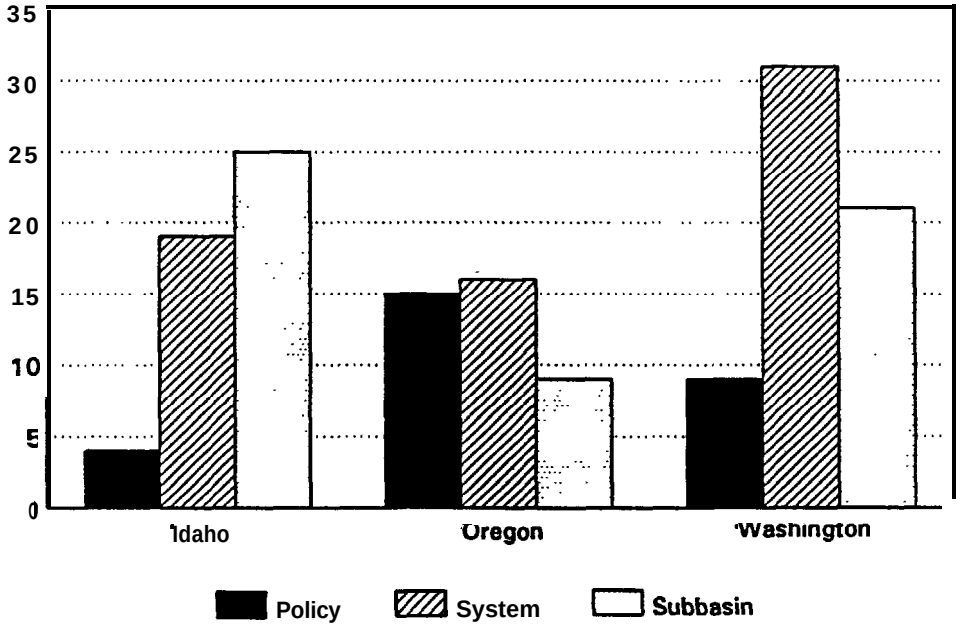
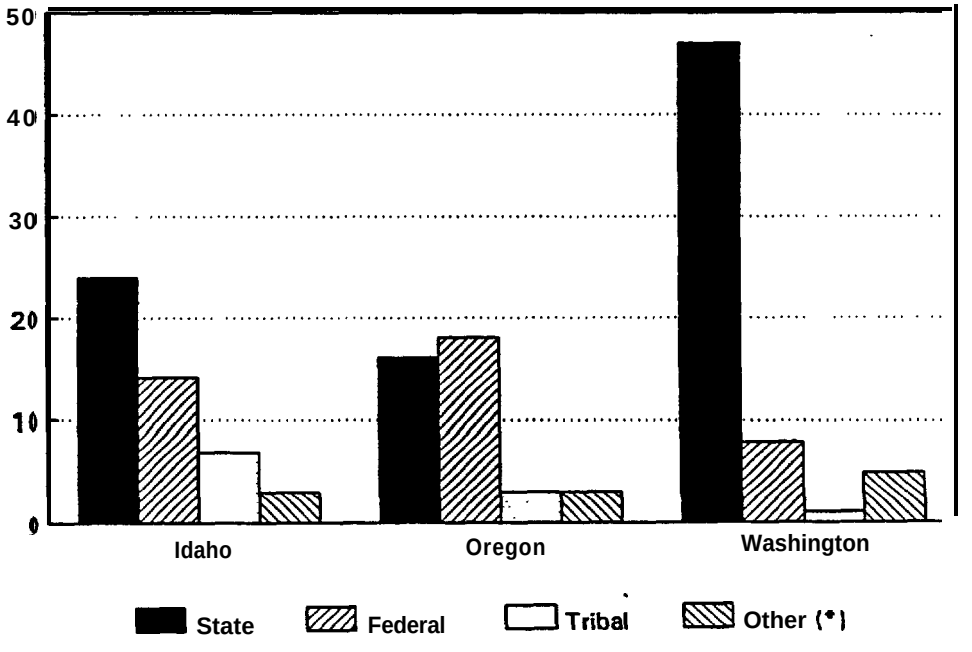
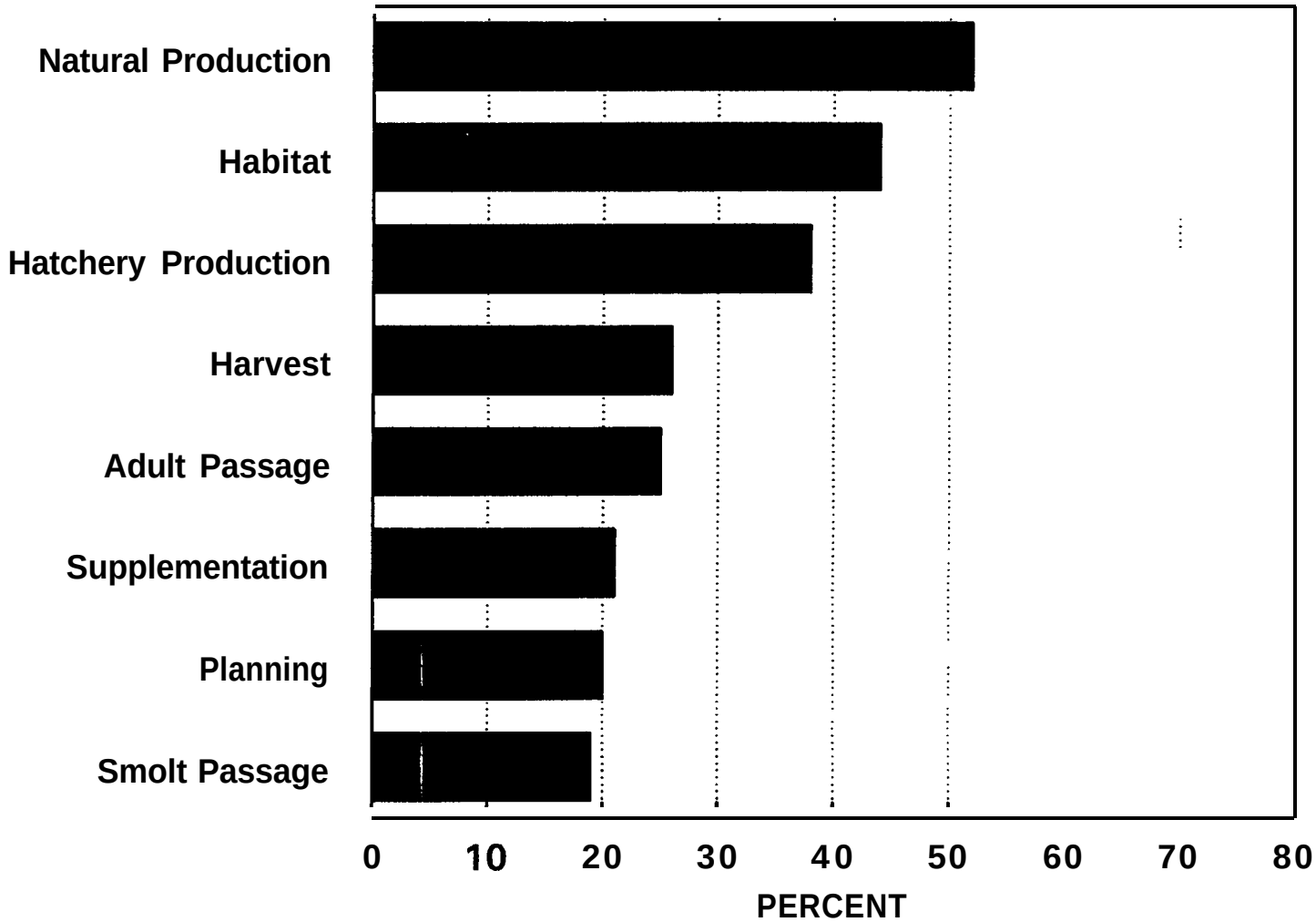


FIGURE 1.3b
Respondents by employing entity



(*) University, consultants, etc

FIGURE 1.4
What type of data do you collect?
(n = 99)



Note: Mom than one answer was permissable.

TABLE 1.1

Methods identified by respondents for reporting and accessing data (N = 138)

	Method for Reporting Data		Method for Accessing Data	
	(N)	(Rank)	(N)	(Rank)
Annual Reports	90	(1)	107	(1)
Internal Agency Files	67	(2)	80	(3)
Personal Files	59	(5)	60	(7)
Internal Agency Database	56	(6)	73	(4)
Personal Database	43	(7)	46	(8)
External Agency Database	28	(8)	62	(6)
Professional Meetings	65	(4)	62	(6)
Personal Conversations	66	(3)	90	(2)
Professional Journals	27	(9)	63	(5)

Note: More than one answer was permissable

Most people said they have some responsibility for managing, updating, and otherwise maintaining their data. Half of the people do all the work with their data while one quarter have partial responsibility. One third of the surveys returned indicated that a data manager is responsible for the data collected.

People were surveyed as to the type of data they use and what years of data are important in their typical analysis. Natural and hatchery production data were indicated by the survey as the information most used by the respondents (Figure 1.5). When doing their analysis, data from the last twenty years was the most important time period for those surveyed (Figure 1.6).

Spring chinook and summer steelhead, both wild/natural and hatchery, were the major stocks of interest in the Columbia River Basin (Figure 1.7). Interest ranged from 11% for hatchery chum salmon to 75% for wild/natural spring chinook.

Most respondents shared a regional perspective in terms of natural and hatchery production. Thirty-eight percent of the surveys returned indicated an interest in both natural and hatchery production for the entire Columbia River Basin.

The primary regional electronic data sources accessed and identified by respondents included the coded wire database (35 %), Fish Passage Center information (33 %), CROHMS dam count information (25%), the Northwest Environmental Database (25%), Pit Tag information (16%), and STORET (12%).

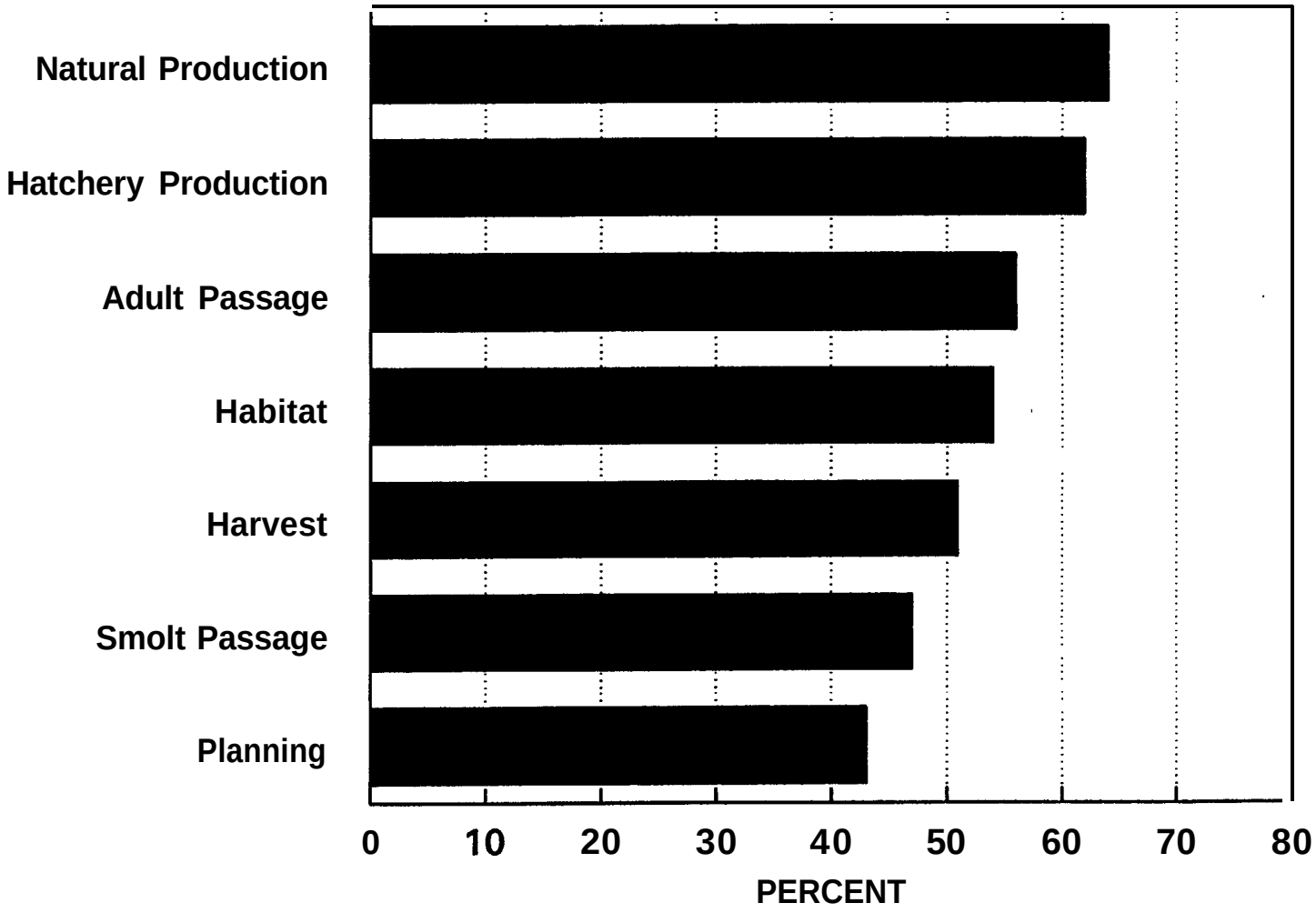
Most respondents depended, at least partially, on someone else to access computerized data. Only 12 % did all their computer accessing, 43 % did some, and 26% did none (19 % no response).

People were also assessed as to their use of computer hardware and software. Most respondents depended on IBM-compatible personal computers to maintain and analyze their data (Figure 1.8). MS-DOS was the primary operating system used by those who responded to that particular question. Other operating systems in use included UNIX, VAX VMS, and miscellaneous other operating systems (Table 1.3a). Software dependency varied greatly with dBase, Paradox, Rbase, Smart, and Oracle being the most popular database management packages (Table 1.3b). Lotus and Quattro Pro were by far the most frequently used spreadsheet packages (Table 1.3c). Word processing software was dominated by Word Perfect and Microsoft Word (Table 1.3d). Other software identified included Harvard Graphics as the most popular graphics package, and SYSTAT and SAS as the statistics packages of choice (Table 1.3e) Of the people surveyed, 75 % said they have a modem. Most use Procomm, Smartcomm, PC Link, or Crosstalk as their communications software (Table 1.3).

FIGURE 1.5

What type of data do you use?

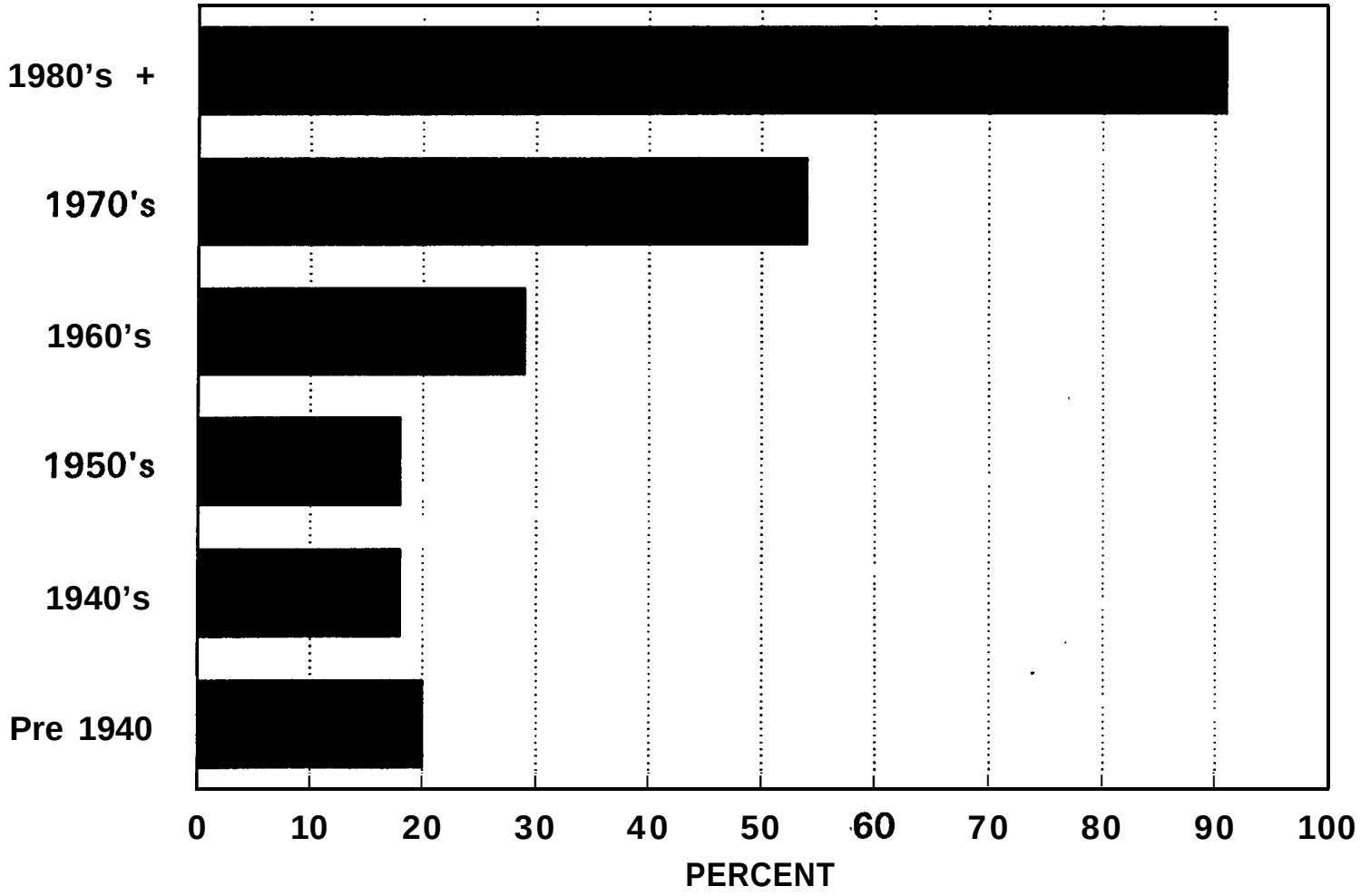
(n = 138)



Note: Mom than one answer was permissible.

FIGURE 1.6

What years of data are important to your typical analysis? (n = 138)

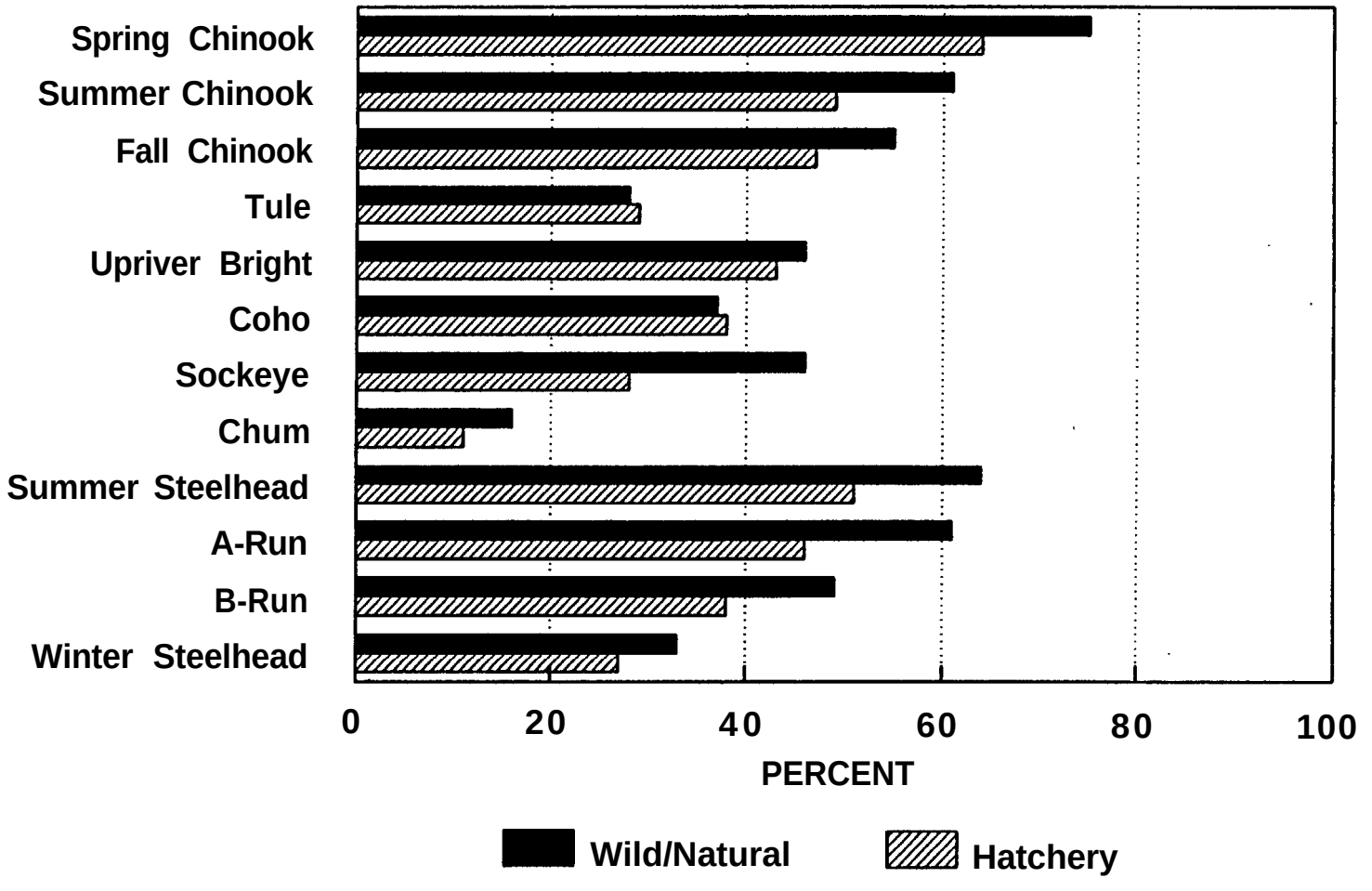


Note: Mom than one answer was permissible

FIGURE 1.7

Major species of interest to respondents

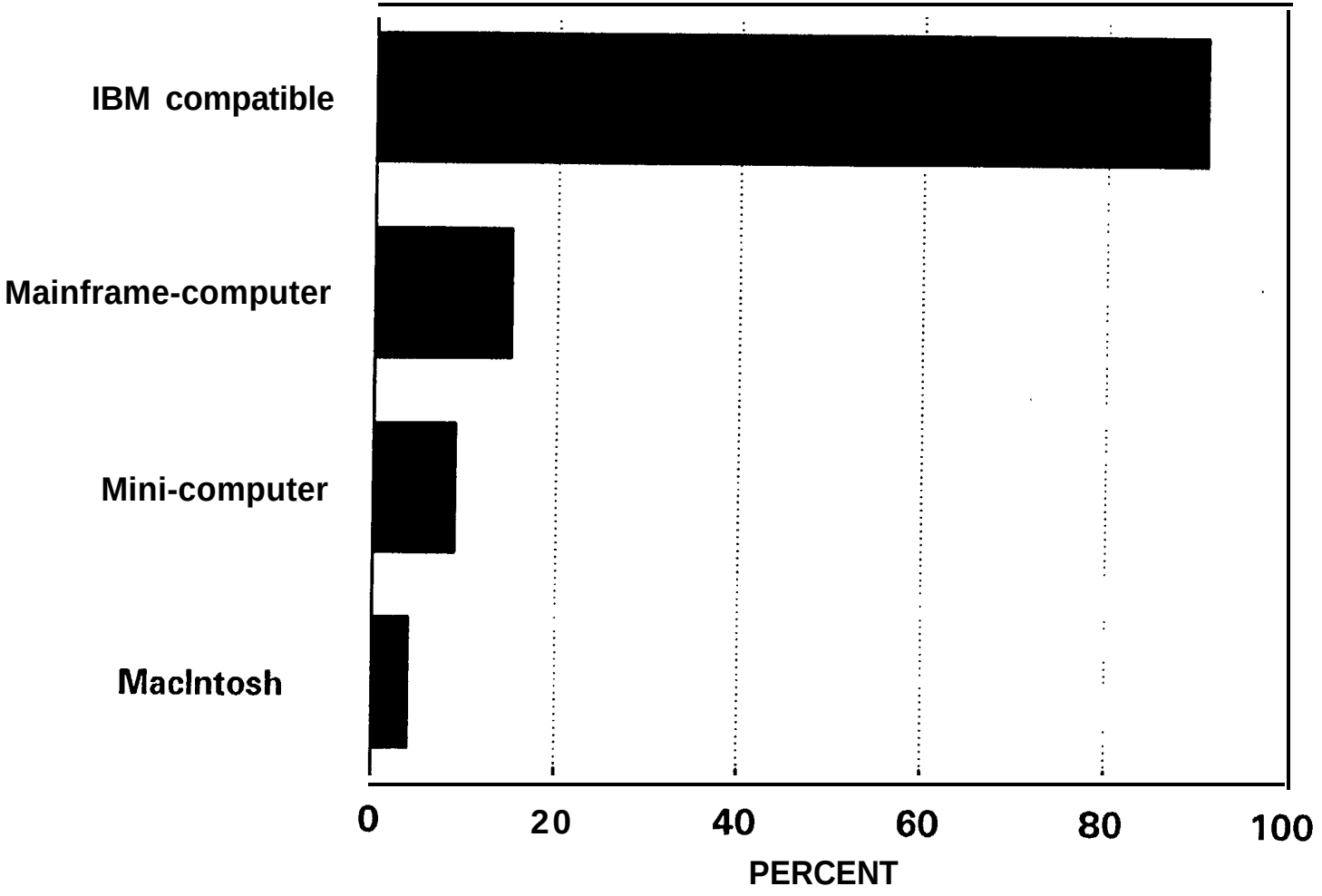
(n = 138)



Note: More than one answer was permissable.

FIGURE 1.8

What computer hardware do you use to maintain and analyze your data?



Note: Respondents wan allowed to check more than one position category.

Table 1.2. Computer software in use by respondents (n = 138).

a. Operating System	
MS-DOS	21
AOS/VS	1
Primos	1
Data General	1
UNIX	5
OS/2	1
VAX VMS	4
MAC	1
CPM	1
FS Net	1
Total	37

b. Database Software	
dBase	29
Paradox	9
Rbase	5
Smart	2
Oracle	2
Pandora	1
PC-File	1
Revelations	1
Stream Survey	1
Symphony	1
INFO	1
Prime Inform	1
System	1
2M	1
Total	56

c. Spreadsheets	
Lotus	26
Quattro Pro	24
Excel	4
CEO	1
DG	1
Framework	1
Symphony	1
Smart	1
ABC	1
Wina2	1
Total	61

d. Word Processing	
Micro Word	14
PC-Write	5
WordPerfect	28
Smart	3
WordMarc	6
WordStar	4
WordMore	1
DG	1
Framework	1
Massil	2
Framemaker	2
EMACS	2
OPN	1
CEO	1
20/20	1
MacWrite	1
Total	73

e. Other Software	
Applause	2
Freelance	4
Harvard Graphics	16
SYSTAT	6
NCSS	2
Norton Util	2
Numb Crunch	1
REDIT	1
Sigma Plot	5
Statgraphics	2
Sideways	1
Deskview	1
Turbo Pascal	1
Windows	2
XTree Gold	2
SAS	5
Arc/Info	3
Aspen/2	1
Basic	1
DrawPerfect	1
SPSS	1
EPPL	1
GIS	1
FormTools	1
PC Tools	2
Statpak	3
RM Fortran	1
Org Plus	1
Crisp	1
Microfish	1
Total	72

f. Communications Software	
Crosstalk	6
Smartcom	10
Procomm	15
3+Mail	1
3Com	1
Attachmate	1
Corpsmail	1
DataGen	2
Data Switch	1
ICC Card	1
Kedit QD3	1
PC Link	8
QModem	1
Relay Gold	1
Softerm	1
Telenet	1
Telexe	1
Unicom	1
Zodiax x.2	1
PC-Talk	1
CompuServe	1
Total	57

System Information Needs

System information is that used by researchers, managers and policy makers whose area of concern is the entire Columbia River system. Included in this category are things like mainstem passage data, ocean and inriver harvest data and life history information. The purpose of this section is to present and discuss the results of the System Information needs survey.

Of the 144 individuals responding to the survey, 122 completed at least some of the System Information Section. The results, shown in Table 2.1, include Criticality and Availability indices and Gap Indices for all respondents as well as a breakdown by responsibility level (Policy, System Technical and Subbasin Technical). These results indicate some general characteristics. First, in general the responses to individual data items tended toward the "Critical" end of the scale with relatively few respondents that considered items as being merely "helpful". As for "Availability", Systems Information appears to be generally regarded as "Inadequate" with somewhat fewer responses tending toward "Adequate". Few respondents considered data in any particular cell to be "Missing" altogether.

Within the first category (S100 Series), that which dealt with the effectiveness of the Northwest Pacific Power Planning Council's Fish and Wildlife Program, topics exhibiting high Gap Indices were Submerged Traveling Screens (i.e. FGE), the efficacy of transportation, the current and future efficiency of upstream adult passage, the state of hatchery effectiveness (current and future), information on the potential for improving natural runs through supplementation and, finally, information that would permit a genetics assessment. The last three topics, hatchery effectiveness, supplementation and genetic risks, are discussed in more detail in other sections.

The need for information on Escapement and Spawners (S200 Series) was expressed fairly consistently. Respondents indicated that information on escapement and the numbers of spawners was generally less available in the tributaries than in the mainstem region or at the mouth of the Columbia River.

The third section dealt with Adult Dam Loss or Conversion (Section S300). Respondents appear to consider this type of information slightly more important in the lower Columbia and Snake River region than in the mid Columbia region.

Harvest was divided into three sections; Ocean Harvest (S400), Inriver Harvest (S5OO) and Subbasin Harvest (S600). In each section more individuals responded to questions about catch and harvest rates than to other questions. The highest Gap Indices were indicated for stock specific harvest information due to availability of data. Economic and social information were not regarded as being highly critical.

"Presmolt Production" (S700) is primarily aimed at steelhead production. There was a high level of response to this section in which respondents were divided as to whether individual

SYSTEM TABLE RESULTS

TABLE 2.1 - CIS SURVEY SYSTEM INFORMATION NEEDS
(CI) criticality (N) number of responses
(AI) availibility (GI) CI / AI

Total number of surveys returned 122	ALL STATES					RESPONSIBILITY		
	OVERALL					POLICY	SYSTEM	SUBBASIN
	CI	(N)	AI	(N)	GI	GI	GI	GI
S 100 "'FISH & WILD PROG EFFECT DATA"'								
S101 Water budget	2.3	(54)	2 4	(43)	0.9	1.0	0.9	0.9
S102 screens (FGE)	2.4	(40)	2.2	(30)	1.1	11	1.0	1.3
S 103 Transportation	2.3	(45)	2.3	(35)	1.0	0.9	1.1	1.0
S104 Upstream passage improvement	2 4	(48)	2.2	(39)	1.1	1.2	1.1	1.0
S105 Habitat improvement	2.1	(54)	2.2	(45)	1.0	0 9	1.0	1.0
S106 Program hatchery production	2 2	(49)	2 6	(45)	0 8	0 7	0.9	0 9
S107 Hatchery effectiveness	2.5	(53)	2.1	(46)	1.2	1.0	1.2	1 4
S108 Supplementation	2.5	(53)	2.0	(47)	1.2	1.1	1.2	1.3
S109 Genetic risks	2.3	(50)	1.9	(46)	1.2	1.1	1.3	1.3
S110 Contribution to doubling goal	2 0	(48)	2.1	(43)	0.9	1.1	0.9	0.9
S111 Program costs	1.9	(36)	2.3	(33)	0.8	0.9	0.7	1.0
S200 ● "ESCAPEMWT and SPAWNERS"'								
S201 Columbia R. mouth	2.3	(47)	2.4	(43)	1.0	0.7	1.0	1 0
S202 Bonneville Dam	2.5	(51)	2.6	(45)	1.0	0.7	1.1	1.0
S203 To upper dam	2 5	(59)	2 7	(50)	0.9	0.8	0.9	1 0
S204 By major tributary	2.4	(66)	2.1	(56)	1.2	1.0	1 2	1.2
S205 By indicator stream	2.4	(54)	2.0	(48)	1.2	0.9	1.3	1.2
S300 "'ADULT DAM LOSS/CONVERSION***								
S301 Bonneville to McNary	2.3	(47)	2.1	(43)	1.1	1.1	1.2	0.9
S302 McNary to Ice Harbor	2.3	(40)	2.1	(36)	1.1	1.1	1.2	0.8
S303 Ice Harbor to Lower Granite	2.3	(40)	2.1	(36)	1.1	1 2	1.2	0.6
S304 McNary to Priest Rapids	2.1	(38)	2.1	(34)	1 0	0.9	1.2	0.7
S305 Priest Rapids to mid-Col dams	2.0	(34)	2.2	(32)	0.9	0.7	1.2	0.6
S400 ---OCEAN HARVEST***								
S401 Catch	2.3	(49)	2.4	(40)	1.0	0.9	0.9	11
S402 Harvest rate	2.3	(50)	2 2	(41)	1.0	0.9	1.0	1.1
S403 Allocation by fishery	2.2	(42)	2.3	(36)	1.0	0.8	0.9	1.0
S404 Stock-specific	2.4	(39)	2.1	(33)	1.1	1.3	1.2	0.9
S405 Economics/social	1.6	(39)	2.2	(36)	0.7	0.7	0.8	0.7
S500 ***INRIVER HARVEST"								
S501 Catch - Zones 1-6	2.4	(58)	2 5	(48)	1.0	0 7	1.0	1.0
S502 Harvest rate - Zones 1-6	2.4	(59)	2 4	(49)	1.0	0.8	1.1	1.0
S503 Allocation by fishery	2.2	(45)	2.5	(37)	0.9	0 7	0.9	1.1
S504 Stock-specific	2 7	(45)	2 1	(37)	1.3	1.2	1.4	1.1
S505 Economics/social	1.6	(31)	2.2	(26)	0.7	0.7	0.8	0.6
S600 ***SUBBASIN HARVEST***								
S601 Catch	2 4	(52)	2.4	(44)	1.0	0.7	1.0	1.2
S602 Harvest rate	2.3	(53)	2.3	(45)	1.0	0.8	1.0	1.2
S603 Allocation by fishery	2.2	(43)	2 4	(37)	0.9	0.6	0.9	1.0
S604 Stock-specific	2.4	(35)	2 3	(30)	1.1	1.3	1.0	1.1
S605 Economics/social	1.7	(35)	2.0	(27)	0.6	0.8	0.9	0.8
S700 ***PRESMOLT PRODUCTION***								
S701 Carrying capacity	2.3	(60)	2.0	(50)	1.1	1.4	1.1	1.1
S702 Egg to parr survival	2.2	(57)	2.0	(48)	1.1	1 4	1 0	1.2
S703 Potential carrying capacity	2.2	(58)	2 0	(48)	1.1	1.2	1.0	1.3
S704 Production levels by subbasin	2.2	(58)	2 0	(46)	11	1.0	1.1	1.1
S705 Production levels - indicator or other stocks	2.2	(40)	2 0	(34)	1.1	1.1	1.1	0.9
S800 "'SMOLT PRODUCTION***								
S801 Carrying capacity	2.3	(63)	2 0	(55)	1.2	1.3	1.2	1.1
S802 Egg to smolt survival	2 2	(57)	2.0	(48)	1.1	1.4	1.0	1.2
S803 Potential carrying capacity	2.3	(61)	1.9	(53)	1.2	1.1	1 1	1 4
S804 Production levels by subbasin	2 3	(60)	2 0	(51)	11	1.1	1.2	11
S805 Production levels - indicator or other stocks	2.2	(47)	2.1	(42)	1.0	1.0	1.1	1.0
S806 Hatchery releases	2.5	(58)	2.6	(48)	0.9	0.9	0.9	0.9
S900 ***SMOLT PASSAGE and SURVIVAL"'								
S901 Reservoir survival	2 4	(54)	2.0	(43)	1.2	1.3	1.2	1.0
S902 Smolts arriving at dams	2.3	(52)	2.3	(43)	1.0	1.1	1 0	1.0
S903 Number transported	2.1	(50)	2 7	(42)	0.8	0.9	0.8	0 7
S904 Transport benefit ratio	2 2	(46)	2 1	(38)	1 1	1 2	1 1	0.8
S905 Fish guidance efficiency	2.3	(49)	2.2	(40)	1.1	1.4	1.0	0.8
S906 Bypass survival	2 4	(49)	2 1	(41)	1 2	1 3	1.1	1.1
S907 Turbine survival	2 4	(48)	2 1	(41)	1 1	1 2	1.1	1.1
S908 Predation rates	2 4	(50)	2.0	(44)	1.2	1 3	1.2	1.1
S909 Total smolt survival	2 6	(56)	2 0	(46)	1.3	1 4	1.3	1 1
S910 Arrival timing -aggregate stocks	2 2	(51)	2 4	(41)	0 9	1 0	0 9	0 9
S911 Arrival timing - indicator stocks	2.3	(50)	2 4	(40)	1.0	1 0	0.9	1 0
S912 Flow/velocity effects	2.5	(53)	2.0	(42)	1 2	1 4	1.2	1.1
S913 Spill effects	2.3	(50)	2 1	(41)	I 1	1.2	1 1	1 0
S914 Gas supersaturation effects	2 0	(50)	2 3	(41)	0 9	1.0	0 9	0.8

items were “Critical” or “Important” but there was general agreement that the data are inadequate. For that reason the Gap indices tended to be fairly high. This section and the next are important in analytical terms because they contain data items such as ‘Carrying Capacity” and “Egg to Smolt Survival” that are used to determine a stock’s production potential.

The “Smolt Production” section (S8OO) is directed to anadromous salmonids other than steelhead and, like the similar, previous section, received a relatively high response rate as well as a similar pattern in the responses. The first four items in particular had high numbers of respondents and high Gap Indices again due in part to the important role they play in system modeling.

The final section (S900) involves Smolt Passage and Survival in the mainstem region. This section also received many responses in part due to importance in system modeling and because of its importance in the management of various fish stock. Responses typically indicated that the individual items tended to be critical and inadequate. As a result, the highest Gap Indices in the System Information Section are shown for some items including Reservoir Survival, Bypass Survival, Predation Effects, Total Smolt Survival and Flow/Velocity Effects.

The needs that emerged through the survey process are in close agreement with those expressed in the Integrated System Plan (CBFWA, 1990). In fact, not surprisingly, they are the same needs emerging through several programs that depend on a system approach to analyzing the status of fish stocks such as the Endangered Species Act and the System operations Review (ad hoc Technical Coordination Work Group, February 1992). Systems approaches require specific survival estimates throughout the life cycle of any given fish stock and the System Information Section was intended to cover all aspects of the anadromous salmonid life cycle.

During System Planning, several areas were identified as being particularly important because it was felt that gains in these areas would have a dramatic impact on the analytical capability of those involved in systemwide assessments. Three areas of importance are Smolt Passage and Survival (S900), Smolt Production (S8OO) and Presmolt Production (S700). These are areas where quantitative assessment is difficult, where the results require careful interpretation and, consequently, where much more work is needed. The need for more information about the latter two, smolt and presmolt production, is the reason for the Natural Production Section. With regard to Smolt Passage and Survival, however, several items are crucial. Passage analyses are very sensitive to assumptions about Transport Benefit Ratios and to assumed Fish Guidance Efficiency values, particularly at transport dams. Turbine, Bypass and Spill Survival rates impact analyses to a great extent as well. Reservoir Survival and impacts of predators on survival are items of timely importance to managers. Flow/Velocity effects are possibly the most controversial items in the region because of the potential expense and system modifications necessary to increase flow rates.

Another area of importance is Adult Dam Loss/Conversion (S300) which, like Smolt Passage and Survival, is currently receiving considerable attention because of its importance to overall system survival. Currently, little is known about adult interdam losses and efforts to reduce them have only recently begun.

Most of the other sections deal with harvest and escapement, areas that are of direct importance to managers and that are under reasonably close scrutiny by existing management entities. Here the need is for additional information more than the methodologies to analyze the information. However, even in harvest 'management there is a recognized need to increase the emphasis on systems approaches to analyzing information.

Natural Production Information Needs

Natural Production Data

Natural production survey responses were summarized by individual data elements. The overall criticality, availability and gap indices are presented in Table 3.1. This table also presents gap indices summarized by level of responsibility: policy, system technical or subbasin technical. Appendices Cl - C4 contain the distribution of responses by data element for the region and for the three levels of responsibility.

Data Need

A high criticality of need was expressed for many of the natural production data elements (Figure 3.1). Three-fourths of the elements scored higher than 2.0, where 2.0 equates to a rating of "important". All data elements were perceived as critical by at least some workers in the basin (Appendices Cl - C4).

The highest criticality indices were generally in areas of production, survival at different life stages, subbasin harvest and influence of hatchery fish (Pig. 3.1, Table 3.1). The lower criticality indices tended to be for individual fish measurements, meristics, morphometrics and habitat project cost accounting. None of the indices were lower than 1.6. The lower ratings were also associated with fewer responses.

Data Availability/Adequacy

Most natural production data elements were perceived as incomplete or inadequate (Figure 3.2 and Table 3.1). The availability index ranged from 1.7 to 2.4, where a rating of 1 equated to "missing", and ratings of 2 and 3 were "incomplete/inadequate" and "available/adequate", respectively. Over one-fourth (29 %) of the natural production availability indices were less than 2.0.

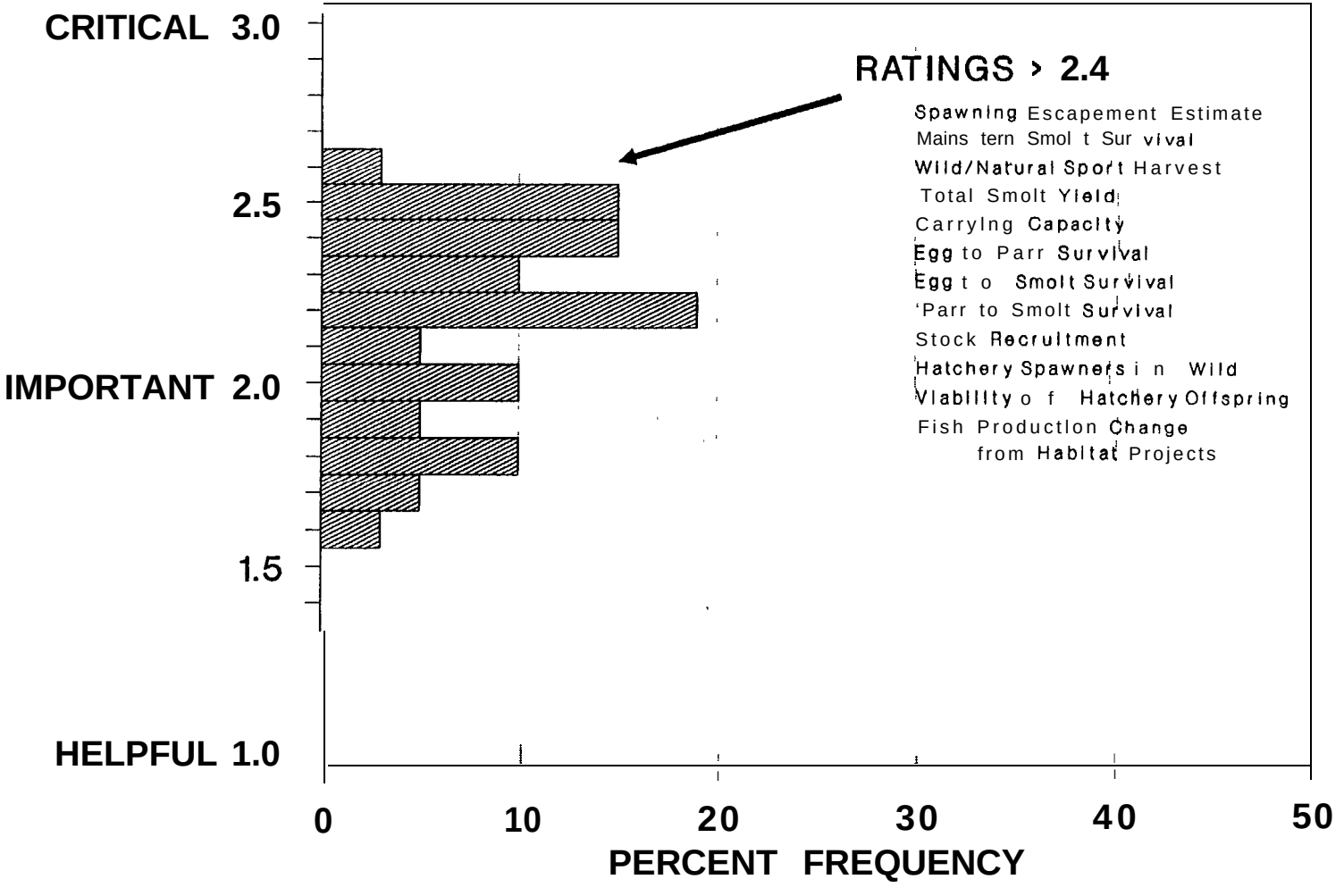
Most of the lower availability indices were in the categories: migrants smolts (N300); survival, recruitment, production studies (N400); and genetics characteristics (N500) (Table 3.1). The low availability index was also coupled with high criticality indices for many life-stage survival and carrying capacity data elements. Categories with data perceived to be generally more available or adequate were escapement, spawners and subbasin harvest (N100); juveniles (N200); and Fish and Wildlife Program-Habitat (N600).

Table 3.1 - CIS Survey Natural Production Results

(CI) Criticality (n) Number of reposses (AI) Availibility (GI) CI/AI	ALL STATES OVERALL CI	(n)	AI	(n)	GI	RESPONSIBILITY POLICY GI	SYSTEM GI	JBBASIN GI
N100 *** ESCAPE, SPAWN, AND SUBBAS HARVEST ***								
N101 SPAWNER WEIR COUNT	2.4	51	2.2	43	1.1	0.9	1.1	1.1
N102 SPAWNING ESCAPEMENT ESTIMATE	2.6	n	2.2	58	1.2	1.1	1.2	1.2
N103 TOTAL REDDS IN DRAINAGE	2.3	66	2.2	52	1.1	1.0	1.0	1.1
N104 REDD COUNT - INDEX OR TREND	2.3	n	2.3	57	1.0	1.0	1.0	1.1
N105 EGG DEPOSITION ESTIMATE	20	46	1.9	40	1.0	W	1.0	1.2
N106 SPAWNER AGE COMPOSITION	2.2	53	2.1	43	1.0	1.1	1.0	1.1
N107 SPAWNER LENGTH FREQUENCY	1.8	50	2.2	40	0.8	0.8	0.8	0.8
N108 ADULT LENGTH-WEIGHT	1.6	40	2.0	34	0.8	0.7	0.8	0.8
N109 SPAWNER SEX RATIO	2.0	53	2.1	42	0.9	0.9	1.0	0.9
N110 FECUNDITY	2.2	49	2.1	42	1.0	0.9	1.0	1.1
N111 SPAWNER DISTRIBUTION IN BASIN	2.3	58	2.1	47	1.1	1.1	1.0	1.1
N112 SPAWNING TIMING	2.2	66	2.4	54	0.9	0.8	0.9	1.0
N113 STRAYING RATE	2.2	54	2.0	46	1.1	1.0	1.1	1.2
N114 REPEAT SPAWNERS (STEELHEAD)	1.6	38	2.0	32	0.8	0.6	0.6	1.1
N115 HATCHERY SPAWNERS IN WILD	2.4	64	1.9	51	1.2	1.2	1.2	1.4
N116 WILD/NATURAL SPORT HARVEST	2.5	58	2.3	48	1.1	1.0	1.1	1.1
N117 WILD/NATURAL TRIBAL HARVEST	2.4	51	2.2	41	1.1	0.9	1.2	1.2
N200 *** JUVENILES •								
N201 TOTAL PARR ABUNDANCE	2.4	49	2.0	42	1.2	0.9	1.2	1.4
N202 DENSITY - AGES COMBINED	2.1	47	2.0	41	1.1	0.8	1.0	1.2
N203 DENSITY - BY AGE	2.2	45	2.0	38	1.1	0.9	1.0	1.2
N204 LENGTH FREQUENCY	1.9	39	2.2	36	0.9	0.8	0.8	1.0
N205 LENGTH - WEIGHT	1.9	36	2.1	32	0.9	0.7	0.9	1.1
N206 CONDITION COEFFICIENT	1.8	37	2.0	32	0.9	0.8	0.9	1.0
N207 EMERGENCE TIMING	2.2	53	2.0	45	1.1	1.1	1.0	1.1
N208 DISTRIBUTION (TIME/AREA)	2.3	53	2.0	46	1.1	1.0	1.1	1.2
N209 SUPPLEMENTATION HISTORY	2.3	48	2.3	42	1.0	0.8	1.0	1.1
N300 *** MIGRANTS/SMOLTS ***								
N301 SMOLT YIELD (TOTAL)	2.5	57	2.0	47	1.3	0.9	1.2	1.5
N302 INDEX OR RELATIVE YIELD	2.3	39	1.8	32	1.2	0.9	1.1	1.6
N303 SMOLT SIZE DISTRIBUTION	1.9	42	2.2	36	0.9	0.6	0.8	1.1
N304 LENGTH - WEIGHT	1.8	38	2.1	35	0.9	0.7	0.9	1.0
N305 PROPORTION SMOLTING BY AGE	2.0	46	1.9	39	1.1	0.8	1.0	1.3
N306 RESIDUALISM	2.2	48	1.9	39	1.2	0.8	1.1	1.4
N307 TIMING	2.4	59	2.1	47	1.1	0.8	1.2	1.2
N308 TRAVEL TIME	2.3	61	2.0	47	1.1	0.9	1.2	1.2
N400 *** SURVIVAL, RECRUITMENT, PRODUCTION STUDIES ***								
N401 PRESPAWNING SURVIVAL	2.4	44	1.8	37	1.3	1.6	1.3	1.2
N402 CARRYING CAPACITY	2.5	55	1.9	48	1.3	1.3	1.3	1.2
N403 EGG TO FRY SURVIVAL	2.4	48	1.8	41	1.3	1.5	1.1	1.4
N404 EGG TO PARR SURVIVAL	2.5	47	1.9	39	1.3	1.5	1.1	1.4
N405 EGG TO SMOLT SURVIVAL	2.5	50	1.9	41	1.3	1.4	1.2	1.5
N406 PARR TO SMOLT SURVIVAL	2.5	48	1.8	39	1.3	1.5	1.2	1.5
N407 INBASIN SMOLT SURVIVAL	2.4	54	1.8	44	1.3	1.3	1.3	1.3
N408 MAINSTEM SMOLT SURVIVAL	2.6	52	1.9	42	1.4	1.3	1.3	1.5
N409 SMOLT TO ADULT RETURN	2.5	64	2.1	50	1.2	1.2	1.3	1.1
N410 STOCK RECRUITMENT	2.5	46	2.0	40	1.3	1.2	1.4	1.1
N411 PRODUCTION (TISSUE ELABORATION)	1.7	25	1.9	21	0.9	0.8	0.8	1.1
N412 INFLUENCE OF COVER	2.0	47	2.1	40	0.9	0.9	0.9	1.0
N413 INFLUENCE OF SEDIMENT	2.2	50	2.1	41	1.0	0.9	1.1	1.1
N414 INFLUENCE OF LWD	2.0	44	2.1	38	0.9	1.0	0.9	1.0
N415 INFL OF CHANNEL UNIT TYPE AND COMPOSITION	2.0	46	2.1	39	1.0	0.9	0.9	1.0
N416 INFLUENCE OF HABITAT TYPE	2.1	48	2.1	41	1.0	1.0	1.0	1.1
N417 INFLUENCE OF TEMPERATURE	2.2	51	2.1	43	1.0	1.1	1.0	1.0
N418 EFFECTS OF HABITAT IMPROVEMENT	2.2	53	1.9	46	1.2	1.7	1.2	1.0
N419 PROJECT COSTS	1.8	32	2.1	28	0.8	1.3	0.7	0.8
N500 *** GENETICS CHARACTERISTICS •								
N501 STOCK HISTORY	2.4	54	2.2	49	1.1	0.9	1.0	1.3
N502 HATCHERY STOCKS SUPPLEMENTED	2.4	47	2.3	43	1.1	1.1	1.0	1.2
N503 HATCHERY STRAYS	2.4	48	1.9	43	1.3	1.2	1.2	1.4
N504 ELECTROPHORETIC PROFILE	2.2	42	2.0	38	1.1	1.1	1.1	1.3
N505 MERISTICS	1.8	31	1.9	27	1.0	0.7	1.0	1.1
N506 MORPHOMETRICS	1.9	32	1.9	28	1.0	0.7	1.0	1.1
N507 PARASITES AND DISEASES	2.1	35	2.0	29	1.1	0.6	1.2	1.2
N508 EFFECTIVENESS OF HAT SPAWN IN WILD	2.5	53	Id	47	1.4	1.4	1.3	1.5
N509 VIABILITY OF HATCHERY OFFSPRING	2.5	49	1.7	42	1.4	1.4	1.2	1.7
N600 *** FISH AND WILDLIFE PROGRAM HABITAT ***								
N601 PRE-PROJECT HABITAT CONDITION	2.1	49	2.1	39	1.0	1.0	1.1	1.0
N602 POST-PROJECT HABITAT CONDITION	2.2	50	2.1	39	1.0	1.0	1.1	1.0
N603 PREDICTED PHYSICAL CHANGE	2.0	50	2.1	39	1.0	1.0	0.9	1.0
N604 ACTUAL PHYSICAL CHANGE	2.2	50	2.1	39	1.0	1.0	1.1	1.0
N605 PREDICTED FISH PRODUCTION CHANGE	2.2	51	2.0	39	1.1	1.2	1.0	1.1
N606 ACTUAL FISH PRODUCTION CHANGE	2.5	53	1.9	42	1.3	1.4	1.3	1.3
N607 PREDICTED INITIAL PROJECT COSTS	1.7	34	2.2	30	0.8	0.7	0.7	0.9
N608 ACTUAL INITIAL PROJECT COSTS	1.8	34	2.2	30	0.8	0.7	0.8	0.9
N609 PREDICTED CONTINUING COSTS	1.7	31	2.2	27	0.8	0.8	0.7	0.9
N610 ACTUAL CONTINUING COSTS	1.8	33	2.2	28	0.8	0.8	0.8	0.9
N611 DISCOUNTED BENEFITS, DISCOUNTED COST	1.7	29	2.1	27	0.8	0.8	0.8	0.8

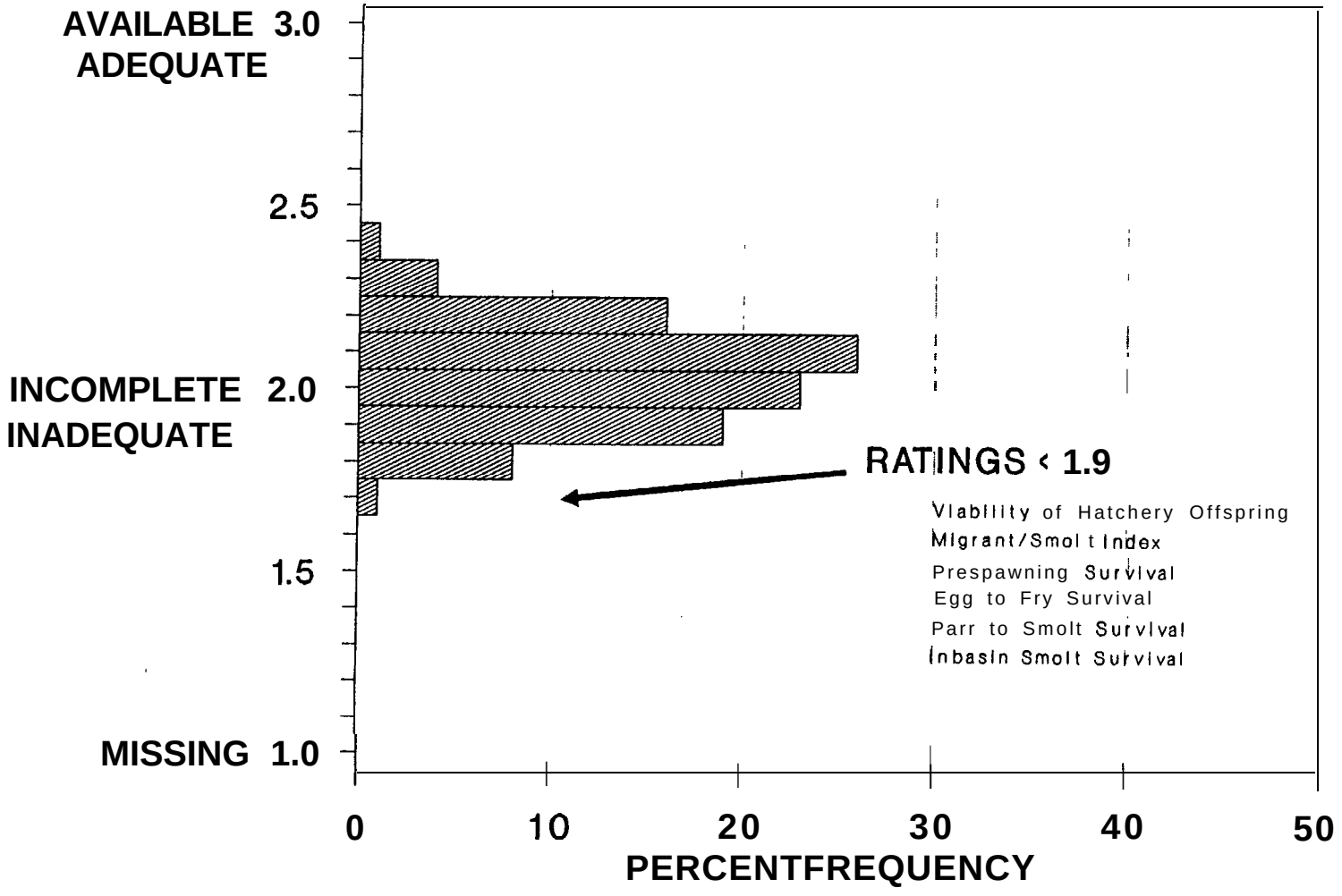
NATURAL PRODUCTION SURVEY
CRITICALITY INDEX

Figure 3.1



NATURAL PRODUCTION SURVEY
AVAILABILITY INDEX

Figure 3.2



Data Gaps

Data gaps were identified from the survey, in part, by a gap index which was the ratio of the criticality index to the availability index. The gap index could range from 0.3 to 3.0, with lowest scores reflecting low criticality/high availability and highest scores reflecting high criticality/low availability. The gap index was compared between responses from policy, system technical and subbasin technical workers.

Three-quarters of the natural production data elements had a gap index of 1.0 or higher (Table 3.1). In general, the subbasin technical workers perceived gaps to be the highest (mean = 1.15), followed by the system technical (1.04) and policy (1.00) groups. The highest gap indices were generally in the areas of production, survival at different life stages, and influence of hatchery fish (Figure 3.3 and Table 3.1). While policy level respondents rated most data gaps lower than technical level respondents, they rated several elements as high or higher than the overall basin response. These pertained to survival at different life stages (N401-N407)

Other Responses

Only 12 of 127 respondents to the natural production and habitat survey listed and rated data elements in addition to those coded in the survey. Volunteered responses were diverse (Table 3.2).

Table 3.2 Additional data elements written in by respondents to natural production data survey (N199-N699).

CIS code	Data element	Data need	Data avail.	Gap Index	Survey No.
N100	**ESCAPEMENT, SPAWNERS AND SUBBASIN HARVEST**				
N199	Females/redd	c	I	1.5	1002
N199	Pathogen and disease prevalence	C	M	3.0	1003
N199	Number of marks sampled	C	A	1.0	W119
N199	CWT recoveries	C	A	1.0	W119
N200	**JUVENILES**				
N299	Pathogen and disease prevalence	c	I	1.5	1003
N299	Diversion bypass trap data	I	A	0.7	0123
N299	Differentiate supplemented stock from wild/natural stock	c	I	1.5	W107
N299	CWT data	C	A	1.0	W119
N299	Physiologic condition	I	M	2.0	1003
N300	**MIGRANTS/SMOLTS**				
N399	Pathogen and disease prevalence	C	M	3.0	1103
N399	Smolt age distribution	c	I	1.5	W107
N399	Spatial distribution	I	I	1.0	W138
N399	Reconstructed production numbers by brood year	C	I	1.5	w143
N399	Physiologic condition	C	M	3.0	1003
N400	**SURVIVAL, RECRUITMENT, PRODUCTION STUDIES**				
N499	Differential survival: supplemented vs. natural	C	I	1.5	1002
N499	Projected benefits	c	I	1.5	1003
N499	Influence of migration flows on smolts	C	A	1.0	W126
N500	**GENETICS CHARACTERISTICS**				
N599	Viability of hatchery offspring -- egg to smolt	C	I	1.5	W106
N599	Viability of hatchery offspring -- smolt to adult	C	I	1.5	W106
N600	**FISH AND WILDLIFE PROGRAM - HABITAT**				
N699	Projected benefits/cost	c	I	1.5	1003

NATURAL PRODUCTION SURVEY
GAP INDEX - HIGHEST VALUES

INDEX	DATA ELEMENT
1.4	Mainstem Smolt Survival Effectiveness of Hatchery Spawners in the Wild Viability of Hatchery Offspring
1.3	Total Smolt Yield Prespawning Survival Carrying Capacity Egg to Fry Survival Egg to Parr Survival Egg to Smolt Survival Parr to Smolt Survival Inbasin Smolt Survival Stock Recruitment Hatchery Strays Actual Fish Production Change due to Habitat Projects
1.2	Spawning Escapement Estimate Hatchery Spawners in Wild Total Parr Abundance Migrant/Smolt Index Residualism Smolt to Adult Return Effects of Habitat Improvement

Figure 3.3

Habitat Data

Habitat survey responses were summarized by individual data element. The overall criticality, availability and gap indices are presented in Table 3.3. This table also presents gap indices summarized by level of responsibility: policy, system technical or subbasin technical. Appendices C5 - C8 contain the distribution of responses by data element for the region and for the three levels of responsibility.

Data Needs

A high criticality of need was expressed for many of the habitat data elements (Fig 2.4). Slightly over half of the elements received criticality index scores averaging greater than 2.0, where 2.0 equates to a rating of "important". All data elements were perceived as critical by at least some workers in the basin (Appendices C5 - C8).

The highest criticality indices tended to be related to irrigation diversions, grazing and land management (Figure 3.4, Table 3.3). Only one analytical approach, cumulative effects analysis, ranked high. Lowest rankings were for invertebrates and general biotic (N1200), and certain elements in categories of water quality attributes (N1100) and habitat analysis/summary (N1600). The large number of optional, surrogate habitat variables and analytical methods may have contributed to somewhat lower criticality scores for individual data elements.

Data Availability/Adequacy

Most data elements for habitat were perceived as incomplete or inadequate (Figure 3.5 and Table 3.3). The availability indices ranged from 1.6 to 2.7. Compared to natural production data, a smaller percentage (16%) of the habitat availability indices were less than 2.0.

Most of the lower availability indices were in the categories: invertebrates, general biotic (N1200) and habitat analysis/summary (N1600). Higher ratings were in categories: drainage basin characteristics (N700), barriers, diversions, screens (N900) and water quantity (N1000).

Data Gaps

Data gaps were identified from the survey, in part, by a gap index which was the ratio of the criticality index to the availability index. The gap index was compared between responses from policy, system technical and subbasin technical workers.

Forty percent of the habitat elements had a gap index of 1.0 or higher (Table 3.3). In general, the subbasin technical workers perceived gaps to be the highest (mean = 1.00),

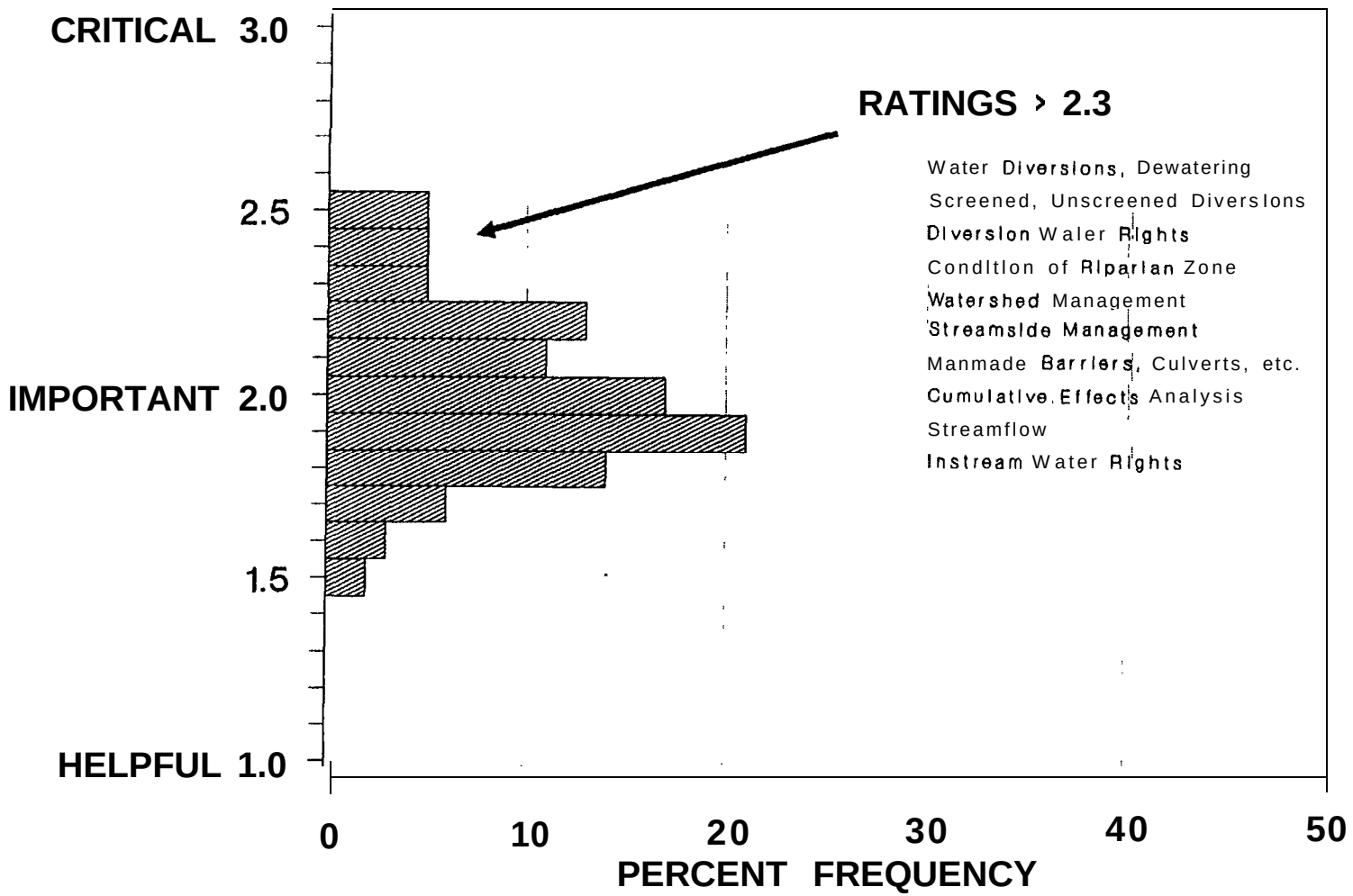
Table 3.3 - CIS Survey Habitat Results

(CI) Criticality (n) Number d reponses (AI) Availibility (GI) CI/AI	ALL STATES OVERALL CI	(n)	AI	(n)	GI	RESPONSIBILITY POLICY GI	SYSTEM GI	JBBASIN GI
N700 . ** DRAINAGE BASIN CHARACTERISTICS ***								
N701 ECOREGION	.0	42	2.5	34	0.8	0.7	0.7	0.8
N702 GEOLOGY	.9	42	2.6	34	a 7	a 7	a 7	a 7
N703 FIRE HISTORY	.6	36	2.4	30	0.7	a 7	a 7	0.7
N704 LANDUSE - QUALITATIVE	.2	49	2.4	38	a 9	a 9	a 9	0.9
N705 LANDUSE - QUANTITATIVE	.3	51	2.3	40	LO	0.9	LO	LO
N706 LANDOWNERSHIP	.7	42	2.7	34	0.6	a 7	a 7	0.6
N707 RIVER PROTECTION	.2	50	2.4	38	a 9	LO	a 9	a 9
N708 WATERSHED MANAGEMENT	.4	55	2.1	43	1.1	L2	L 1	1.1
N709 STREAMSIDE MANAGEMENT	.4	55	2.1	41	1.1	1.1	1.2	1.1
N710 VALLEY SEGMENT TYPE	.9	41	2.2	32	0.8	a 7	a 9	0.8
N711 LANDTYPE	.8	40	2.3	31	0.8	a 7	a 7	0.8
N712 ROAD CONSTRUCTION	.1	45	2.4	35	0.9	0.9	a 9	a 9
N713 VEGETATION	.0	46	2.3	34	a 9	LO	a 9	a 9
N714 SOILS	.9	44	2.5	32	0.8	a 7	0.8	a s
N715 CLIMATE	.8	42	2.6	31	a 7	0.6	a 7	a 7
N800 *** STREAM CHARACTERISTICS . ***								
N801 CHANNELTYPE	.1	49	2.4	39	0.9	0.8	0.9	0.9
N802 STREAM GRADIENT	.0	52	2.4	43	0.8	a 7	a s	a 9
N803 STREAM ORDER	.a	46	2.6	38	a 7	a 7	a 7	a 7
N804 SINUOSITY	.8	44	2.2	36	0.8	a 9	a 7	a 9
N805 WETTED WIDTH	.0	46	2.2	39	a 9	0.8	LO	a 9
N806 BANKFULL CHANNEL	.0	42	2.3	35	a 9	a s	a 9	a 9
N807 MEAN DEPTH	.9	47	2.2	38	a 9	0.8	0.8	a 9
N808 MAXIMUM DEPTH	.0	42	2.2	36	a 9	a s	a 9	a 9
N809 PROFILE	.8	41	2.2	35	0.8	a 8	a 7	LO
N810 AREA/VOLUME BY CHANNEL UNIT TYPES	.9	41	2.1	34	a 9	a 7	LO	LO
N900 *** BARRIERS. DIVERSIONS SCREENS ***								
N901 NATURAL BARRIERS, FALLS, ETC.	.2	51	2.4	45	0.9	1.0	0.9	0.9
N902 MANMADE BARRIERS, CULVERTS ETC.	.4	53	2.3	46	LO	LO	LO	LO
N903 WATER DIVERSIONS, DEWATERING	.5	53	2.3	46	1 1	L 1	1.1	1.1
N904 SCREENED/UNSCREENED DIVERSIONS	.5	53	2.3	47	1.1	1.1	LO	LO
N905 INTERMITTANT BARRIERS	.0	41	2.2	37	a 9	1.0	0.8	0.9
N1000 . ** WATER QUANTITY . **								
N1001 STREAMFLOW	.5	56	24	45	1.0	1.0	1.0	1.1
N1002 STREAM STAGE	.2	35	24	29	a 9	a 9	a 7	LO
N1003 ANNUAL HYDROGRAPH	.1	41	24	34	a 9	a 9	a 9	a 9
N1004 INSTREAM WATER RIGHTS	.4	44	24	37	LO	1.3	a 9	LO
N1005 DIVERSION WATER RIGHTS	.5	43	24	36	LO	1.3	LO	LO
N1006 GAGED IRRIGATION FLOW	.3	38	21	30	1.1	1.2	L 1	1.1
N1100 . ** WATER QUALITY ***								
N1101 TEMPERATURE - INSTANTANEOUS	.1	54	2.3	42	0.9	a s	0.8	1.0
N1102 TEMPERATURE - MAX/MIN	.2	58	21	45	L 1	1.2	a 9	1.1
N1103 TEMPERATURE - CONTINUOUS	.3	51	21	37	1.1	1.2	a 9	1.3
N1104 TURBIDITY	.9	53	21	35	a 9	a 9	0.8	LO
N1105 CONDUCTIVITY	.9	42	2.2	35	a 9	a s	a 8	a 9
N1106 DISSOLVED OXYGEN	.9	49	2.2	41	a 9	a 9	a 7	LO
N1107 TOTAL DISSOLVED SOLIDS	.8	40	21	33	0.8	a s	a 7	LO
N1108 NUTRIENTS	.9	43	20	34	LO	a 9	a 8	1.1
N1109 METALS	.9	40	20	31	a 9	0.8	a 7	1.1
N1110 ALKALINITY/HARDNESS	.9	39	21	32	a 9	0.8	a s	1.1
N1111 PH	.8	40	21	33	a 9	0.8	a 7	1.1
N1200 . ** INVERTEBRATES. GENERAL BIOTIC ***								
N1201 MACROINVERTEBRATE ABUND	L7	44	1.9	35	0.9	a s	a s	1.1
N1202 PRIMARY PRODUCTION	1.7	35	1.7	27	LO	0.8	a 9	L 1
N1203 NUTRIENT UPTAKE STUDIES	1.5	29	1.6	25	a 9	0.8	a s	1.1
N1204 STAND. CROP PARTICULATE ORGANIC	1.6	28	1.8	24	0.9	a s	a 9	1.1
N1300 *** SUBSTRATE ***								
N1301 SURFACE COMPOSITION - VISUAL	2.0	41	2.2	33	0.9	a 9	a 8	1.0
N1302 SURFACE COMPOSITION - MEASURED	1.8	38	20	3	a 9	a 9	a 8	a 9
N1303 EMBEDDEDNESS - VISUAL	1.8	39	21	21	a 9	a 9	a 7	a 9
N1304 EMBEDDEDNESS - MEASURED	20	41	20	3:	LO	1.1	a 9	LO
N1305 SURFACE FINES - VISUAL	3.9	40	21	2	a 9	0.9	a 9	0.9
N1306 SURFACE FINES - MEASURED	20	36	1.9	2	LO	LO	0.9	L 1
N1307 PEBBLE COUNTS	1.9	27	20	2	a 9	a 9	0.9	LO
N1308 CORE SAMPLE	1.7	32	1.8	2	a 9	LO	LO	a 9
N1309 BEADLOAD	1.9	32	20	2	LO	LO	LO	0.9
N1310 % BEDROCK	1.8	32	21	2	a 9	LO	0.9	a s

Tabk 3.3 - CIS Survey Habitat Results Contnued

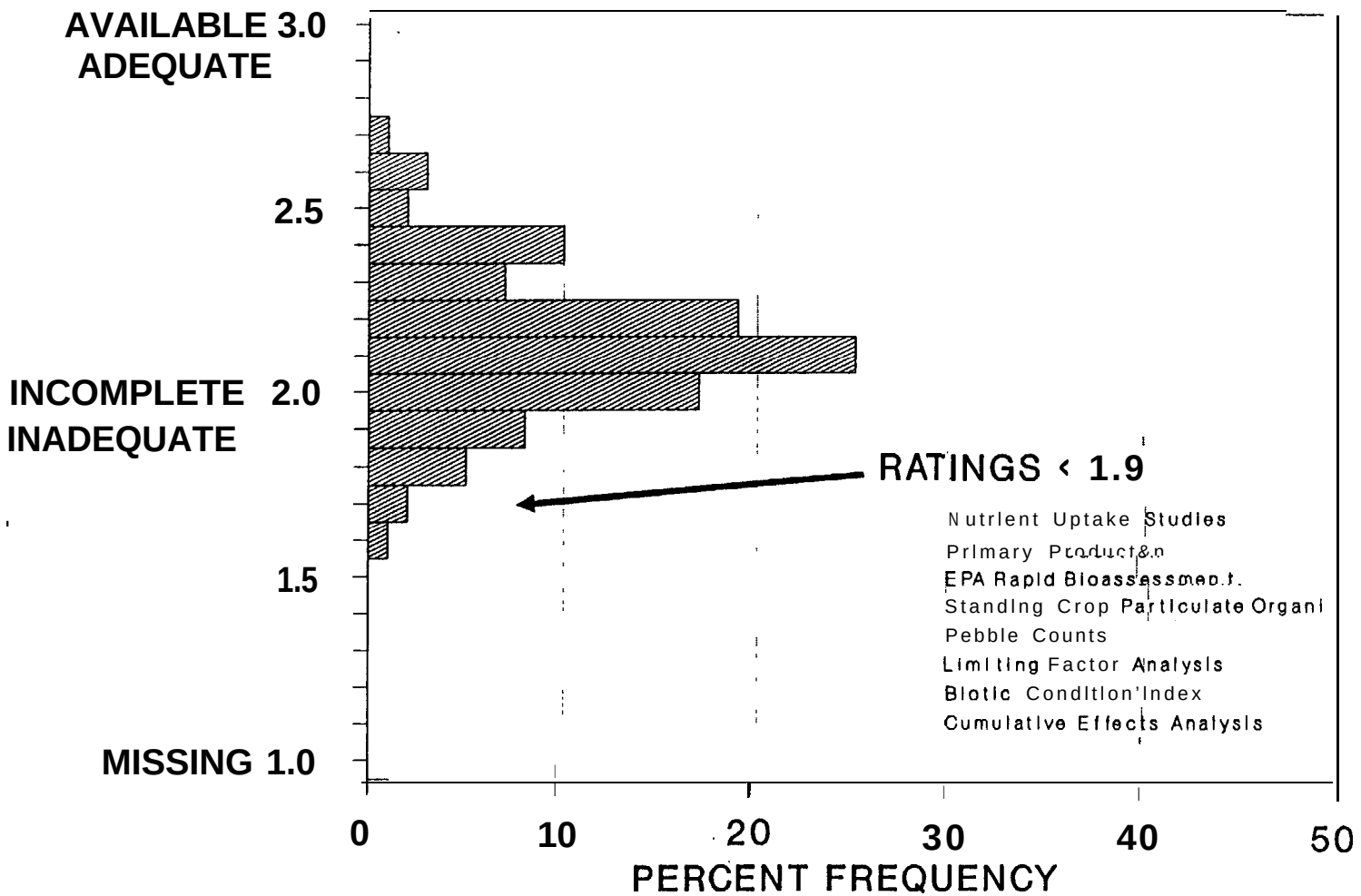
(CI) Criticality (n) Number d reponses (AI) Availibility (GI) CI/AI	ALL STATES OVERALL CI	(n)	AI	(n)	GI	RESPONSIBILITY POLICY GI	SYSTEM GI	SUBBASIN GI
N1400 • ** HABITATTYPE AND COVER • **								
N1401 HABITAT CLASS OR CHANNEL UNIT	2.1	42	22	33	0.9	0.9	1.0	0.9
N1402 AREA BY HABITAT CLASS/UNIT	21	42	2 2 3 4		a 9	LO	a 9	0.9
N1403 VOLUME BY HABITAT CLASS/UNIT	L9	35	21	w	a 9	LO	a s	LO
N1404 POOL:RIFFLE RATIO	22	44	22	35	LO	a 9	L0	LO
N1405 POOL QUALITY	21	43	22	36	LO	a 9	a s	1.1
N1406 POOL FREQUENCY	22	40	22	33	LO	a 9	0.8	1.1
N1407 MICROHABITATFORMED BY	20	30	21	24	a 9	a 9	a 9	LO
N1408 MICROHABITAT DIVERSITY	20	31	21	25	LO	a 9	a 9	LO
N1409 AMOUNT OF COVER	22	47	22	36	LO	L0	LO	L0
N1410 TYPE OF COVER	20	42	21	31	a 9	a 8	a 9	LO
N1411 COVER COMPLEXITY	1.9	37	20	w	LO	a 9	a 9	L0
N1412 WOODY DEBRIS COUNT	21	41	20	32	LO	1.0	LO	1.1
N1413 WOODY DEBRIS VOLUME	1.9	37	L9	w	LO	LO	a 8	1.2
N1414 OVERHANGING VEGETATION	21	41	22	31	LO	LO	LO	LO
N1415 UNDERCUT BANKS	21	42	22	33	a 9	LO	a 9	LO
N1416 MAX DEPTH BY CHANNEL UNIT	20	33	20	26	LO	0.9	a 9	1.0
N1500 *** RIPARIAN AND STREAMBANKS ***								
N1501 CONDITION OF RIPARIAN ZONE	2.5	48	21	38	1.2	1.1	1.2	1.2
N1502 RIPARIAN VEGETATION TYPE	22	43	21	35	LO	L l	a 9	LO
N1503 RIPARIAN VEG. DIVERSITY	20	42	2 2 3 3		a 9	LO	a 9	a 9
N1504 STREAMBANK STABILITY	23	50	21	39	1.1	LO	1.1	1.1
N1505 AMOUNT OF SHADE	22	45	20	34	1.1	L0	LO	1.1
N1506 R4 USFS GREENLINE	L8	23	21	20	a 9	0.8	0.8	L0
N1507 WOODY SPECIES REGENERATION	21	34	20	27	L l	LO	a 9	1.2
N1508 ENCROACHMENTS IN RIPARIAN ZONE	22	38	21	31	1.1	LO	LO	1.2
N1509 FLOODPLAIN WIDTH	1.8	33	21	26	a 9	a 9	0.8	LO
N1510 GRAZING UTILIZATION	23	43	21	35	1.1	1.1	L l	1.1
N1511 SERAL (SUCCESSIONAL) STAGE	L9	31	2 2 2 6		a 9	a 8	a 8	LO
N1512 WOODY DEBRIS RECRUITMENT POTENTIAL	22	36	20	w	1.1	1.1	LO	1.1
N1513 VEGETATION CONDITION IN FLOODPLAIN	20	36	21	w	LO	LO	0.8	L0
N1514 POTENTIAL NATURAL VEGETATION	21	35	21	n	LO	a 9	LO	1.1
N1515 IN-CHANNEL LWD	2.2	38	20	31	L l	1.1	1.1	1.1
N1516 IN-FLOODPLAIN LWD	2.0	35	L9	28	LO	LO	a 9	1.1
N1600 *** HABITAT ANALYSIS AND SUMMARIES ***								
N1601 SEDIMENT YIELD MODELS	1.9	37	2.1	31	0.9	0.9	0.6	1.0
N1602 R1R4FISHSED	1.9	22	20	21	a 9	0.8	a 7	LO
N1603 LIMITING FACTORS ANALYSIS	22	41	1.8	36	1.2	1.2	1.1	1.2
N1604 CHANNEL DYNAMICS	1.8	31	L9	26	a 9	a 7	a 9	1.0
N1605 CHANNEL GEOMETRY	L7	w	1.9	24	a 9	a8	0.6	LO
N1606 CHANNEL STABILITY	1.8	36	20	30	a 9	a s	a 7	LO
N1607 IFIM MINIMUM STREAM FLOW	20	42	1.9	35	LO	1.3	LO	LO
N1608 EPA RAPID BIOASSESSMENT	L6	27	1.7	24	a 9	a 8	0.6	1.2
N1609 BIOTIC CONDITION INDEX	1.5	29	1.8	24	a s	a 7	0.5	LO
N1610 RESIDUAL POOL DEPTH	1.8	29	1.9	26	a 9	a 7	0.8	L l
N1611 RIPARIAN RATE OF RECOVERY	L9	35	20	29	LO	LO	a 8	LO
N1612 REMOTE SENSING/AERIAL PHOTOS	L7	32	2.2	26	0.8	a 8	a 7	a 9
N1613 GIS APPLICATIONS	L9	39	20	32	a 9	LO	a s	1.1
N1614 CHANNEL UNIT DISTRIBUTION	1.7	23	20	20	0.8	a 7	a s	LO
N1615 CHANNEL NETWORK RIPARIAN ANALYSIS	1.9	n	L9	21	LO	LO	0.8	1.1
N1616 CUMULATIVE EFFECTS ANALYSIS	24	40	1.8	36	L3	1.5	L2	1.3

HABITAT SURVEY
CRITICALITY INDEX
Figure 3.4



HABITAT SURVEY
AVAILABILITY INDEX

Figure 3.5



followed by the policy (0.92) and system technical (0.87) groups. Overall, the habitat gap indices were lower than those for natural production data elements.

In addition to water diversions and screens, the highest gap indices tended to be related to watershed and riparian conditions, more so than instream physical habitat and substrate variables (Figure 3.6 and Table 3.3).

Other Responses

Only 11 of 127 respondents to the natural production and habitat survey listed and rated data elements in addition to those coded in the survey. Volunteered responses were diverse (Table 3.4), with most being in the area of water quality.

Table 3.4 Additional data elements written in by respondents to habitat data survey (N799-N1699)

CIS code	Data element	Data need	Data avail.	Gap Index	Survey No.
N700	**DRAINAGE BASIN CHARACTERISTICS**				
N799	Other construction, mining, dredging	C	I	1.5	I003
N900	**BARRIERS, DIVERSIONS, SCREENS**				
N999	Dewatering extent and timing	I	I	1.0	1002
N1000	**WATER QUANTITY**				
N1099	Monthly hydrograph	C	I	1.5	W106
N1100	**WATER QUALITY**				
N1199	Toxicant, pesticide, exfoliants	C	I	1.5	1003
N1199	Effect of hatchery effluents	C	I	1.5	1003
N1199	Sediments	I	I	1.0	1131
N1199	Dissolved gas	I	A	0.7	0170
N1199	Nonpoint source pollutants	I	M	2.0	so01
N1199	CO_2 concentration	I	I	1.0	W132
N1199	Organics	I	I	1.0	W138
N1199	Dioxins	C	I	1.5	W148
N1199	Intragravel D.O.	C	I	1.5	1103
N1199	Fish tissue toxics, pesticides	I	I	1.0	1103
N1199	Bedload	I	I	1.0	1131
N1199	Point source pollutants	I	I	1.0	S001
N1199	Other carcinogens	C	I	1.5	W148
N1699	**HABITAT ANALYSIS AND SUMMARIES**				
N1699	Habitat quality	C	I	1.5	C312
N1699	Habitat Quality Index--rapid intensive bioassessment	I	I	1.0	1103

HABITAT SURVEY
GAP INDEX - HIGHEST VALUES

INDEX	DATA ELEMENT
1.3	Cumulative Effects Analysis
1.2	Condition of Riparian Zone Limiting Factors Analysis
1.1	Watershed Management Streamside Management Water Diversions, Dewatering Screened/Unscreened Diversions Gaged Irrigation Flow Temperature-Maximum/Minimum Temperature-Continuous Streambank Stability Amount of Shade Woody Species Regeneration Encroachments in Riparian Zone Grazing Utilization Woody Debris Recruitment Potential In-channel Large Woody Debris

Figure 3.6

Hatchery Production Information Needs

Data Needs

The Coordinated Information System *Data* Needs Survey conducted in June and July, 1991 returned 118 Hatchery Section responses. Surveys were completed by a wide range of natural resource managers, data users and data generators, but almost 60% of the region-wide respondents represented state agencies, 25% represented federal agencies, and 8% each were representatives of tribal and other categories (private, university, county utility districts, etc.) [Appendix Tables D6-D9]. Over 27 agencies responded to the hatchery production survey [Appendix Table D15].

Survey responses for criticality of hatchery production data needs are summarized in Table 4.1. In general, greater criticality was expressed for data related to pre-hatchery and post-hatchery phases of salmon production. The most critical data item identified *was the total number of salmonids released, this* item was responded to by 70 persons, 49 of which considered number released to be critical [Appendix Table Dl]. Other critical data, in descending order of criticality index, were release *location, smolt to adult survival rate, size at release, release dates, CWT* and *fin-clip data, life stage* or class at *release, smolt outmigration survival rate,* and the *escapement estimate of all stocks in a total run.*

Of all pre-defined questions, none were considered unneeded; in fact **no** question had fewer than two responses of "critical", and most averaged "important". In addition, respondents offered over forty additional hatchery production questions and/or comments to the "canned" survey, many of which were expressed as "critical" data needs [see Appendix Table D14].

Not surprisingly, the lowest criticality indices were generally associated with questions that rated high levels of availability. Criticality indices for the entire hatchery production section of the survey ranged from 1.5 to 2.6, and averaged 2.2 on a scale of zero to three (Figure 4.1).

Data Availability/Adequacy

The availability of data items was also queried by the needs survey. This line of questioning pertains more to data sets covered by other objectives than to hatchery production data, because much of the hatchery data is centralized and of rather known availability. With hatchery production data, the availability question pertains more aptly to accessibility than availability. As with the data needs discussed above, the items expressed as having the lowest availability were contained in the "escapement and spawners" and "release information" sections of the hatchery production survey, not with typical "hatchery" data. Least available were *release residualism data, electrophoretic stock profiles, escapement to smolt* and *smolt outmigration* survival *rates* [Table 4.1, Figure 4.2, Appendix Table Dl].

HABITAT SURVEY
GAP INDEX - HIGHEST VALUES

INDEX	DATA ELEMENT
1.3	Cumulative Effects Analysis
1.2	Condition of Riparian Zone Limiting Factors Analysis
1.1	Watershed Management Streamside Management Water Diversions, Dewatering Screened/Unscreened Diversions Gaged Irrigation Flow Temperature-Maximum/Minimum Temperature-Continuous Streambank Stability Amount of Shade Woody Species Regeneration Encroachments in Riparian Zone Grazing Utilization Woody Debris Recruitment Potential In-channel Large Woody Debris

Figure 3.6

Hatchery Production

Data Needs

The Coordinated Information System *Data Needs Survey* conducted in June and July, 1991 returned 118 Hatchery Section responses. Surveys were completed by a wide range of natural resource managers, data users and data generators, but almost 60% of the region-wide respondents represented state agencies, 25% represented federal agencies, and 8% each were representatives of tribal and other categories (private, university, county utility districts, etc.) [Appendix Tables D6-D9]. Over 27 agencies responded to the hatchery production survey [Appendix Table D15].

Survey responses for criticality of hatchery production data needs are summarized in Table 4.1. In general, greater criticality was expressed for data related to pre-hatchery and post-hatchery phases of salmon production. The most critical data item identified was the *total number of salmonids released*; this item was responded to by 70 persons, 49 of which considered number released to be critical [Appendix Table D1]. Other critical data, in descending order of *criticality* index, were *release location, smolt to adult survival rate, size at release, release dates, CWT* and *fin-clip data, life stage* or *class at release, smolt outmigration survival rate*, and the *escapement estimate of all stocks in a total run.*

Of all pre-defined questions, none were considered unneeded; in fact no question had fewer than two responses of “critical”, and most averaged “important”. In addition, respondents offered over forty additional hatchery production questions and/or comments to the “canned” survey, many of which were expressed as “critical” data needs [see Appendix Table D 14].

Not surprisingly, the lowest criticality indices were generally associated with questions that rated high levels of availability. Criticality indices for the entire hatchery production section of the survey ranged from 1.5 to 2.6, and averaged 2.2 on a scale of zero to three (Figure 4.1).

Data Availability/Adequacy

The availability of data items was also queried by the needs survey. This line of questioning pertains more to data sets covered by other objectives than to hatchery production data, because much of the hatchery data is centralized and of rather known availability. With hatchery production data, the availability question pertains more aptly to accessibility than availability. As with the data needs discussed above, the items expressed as having the lowest availability were contained in the "escapement and spawners" and "release information” sections of the hatchery production survey, not with typical “hatchery” data. Least available were *release residualism data, electrophoretic stock profiles, escapement to smolt* and *smolt outmigration survival rates* [Table 4.1, Figure 4.2, Appendix Table D1] .

CIS SURVEY
HATCHERY RESULTS
(CI) criticality (N) number of responses
(AI) availability (GI) CI / AI

		AU STATES			RESPONSIBILITY		
		OVERALL			POLICY	SYSTEM	SUBBASIN
		c (N)	AI (NJ	GI	GI	Gil	GI
HI00	-'ESCAPEMENT and SPAWNERS-						
H101	Facility Where Spawning Occurs	223 (60)	2.70 (55)	0.60	0.61	076	0.64
H102	sex Ratio d Returning Adults	1.93 (58)	2.75 (51)	0.70	0.66	0.70	0.71
H103	Sex Ratio d Spawners Used	2.02 (53)	267 (46)	0.76	0.72	0.74	0.70
H104	Escapement Estimate (total run-all stocks)	2.45 (64)	2.43 (56)	1.01	0.92	1.02	1.04
H105	Broodstock Total Return Estimate (to F.W.)	2.38 (56)	2.46 (52)	0.96	0.95	0.98	0.05
H106	Broodstock Age Structure	2.15 (59)	2.62 (53)	0 82	0.74	0.66	0.60
H107	Broodstock Fecundity	1.96 (53)	2.62 (50)	0.75	0.68	0.75	0.77
H108	Broodstock Selection Methods	2.26 (53)	2.36 (50)	0.96	1.14	0.95	0.92
H109	Broodstock Health Conditions	2.33 (52)	2.45 (49)	0.95	1.00	0.81	0.97
HI10	Hatchery/Wild Ratio Returned to Hatchery	2.27 (59)	216 (55)	1.05	0.62	1.12	1.06
H111	Broodstock Inclusion Ratio of Wild Fish	2.26 (54)	212 (4s)	1.06	0.62	1.06	1.15
H112	Broodstock Collection Type	2.09 (46)	2.57 (42)	0.61	0.70	0.74	'0.90
H113	Date(s) Broodstock Returned to Hatchery	2.09 (57)	2.63 (51)	0 79	0.74	0.76	0.63
HI14	Dates d Spawning	2.07 (57)	2.71 (52)	0.76	0.74	0.68	0.64
H115	Length Frequency of Spawners by Sex	1.79 (56)	2.56 (52)	0.70	0.70	0.66	0.74
H117	Weight of Spawners	1.46 (39)	2.10 (42)	0.70	0.59	0.71.	0.73
H118	Stock d Origin	2.36 (61)	241 (51)	0.99	0.60	1.02	1.02
H119	Electrophoretic Profile of Stock	2.05 (42)	1.82 (39)	1.12	0.63	1.21	1.16
H120	Repeat Spawning Percentage for Steelhead	1.51 (35)	2.03 (33)	0.75	0.46	0.69	0.96
HI21	Broodstock Mark Return Count	241 (54)	2.66 (47)	0 91	0.66	0.97	0.90
H122	Scale Age vs. Mark Age Correction Factor	1.65 (46)	2.05 (43)	0.90	0.58	0.93	1.02
H I P	Hatchery sport harvest	2.35 (60)	2.46 (52)	0.05	0.61	0.94	1.02
H124	Hatchery tribal harvest	236 (56)	224 (50)	1.05	0.81	1.07	1.15
H200	***HATCHERY INFORMATION***						
H201	Hatchery/Facility Where Eggs Hatched	214 (50)	2.77 (44)	0.77	0.66	0.65	0.69
H202	Hatchery/Facility Fish Last Reared	215 (53)	276 (45)	0.77	0.69	0.67	0.89
H203	Facilities where Fish Previously Reared	2.10 (49)	2.77 (44)	0.76	0.69	0.65	0.67
H204	Hatchery Number(s) or Code(s)	2.09 (45)	2.81 (43)	0.74	0.71	0.66	0.79
H205	Source of Water @ Hatchery	210 (50)	2.80 (45)	0.75	0.71	0.76	0.76
H206	Hatchery Water Quantity	2.04 (49)	273 (44)	0.75	0.81	0.73	0.74
H207	Hatchery Water Quality	2.14 (50)	2.60 (45)	0.62	0.70	0.84	0.65
H208	Hatchery Effluent Quality	1.63 (46)	2.57 (42)	0.71	0.54	0.76	0.73
H209	Hatchery Capacity	2.22 (51)	2.80 (45)	0.79	0.66	0.62	0.61
H210	Hatchery Methods/Procedures	2.29 (49)	251 (43)	0.01	0.70	0.92	0.97
H211	Published Hatchery Goals	2.09 (54)	2.58 (45)	0.61	0.61	0.90	0.62
H212	Major Production Limiting Factors	2.23 (53)	2.36 (45)	0.95	0.76	0.66	1.06
H213	Annual Hatchery Budgets	1.78 (45)	2.75 (40)	0.65	0.60	0.59	0.70
H300	"'REARING INFORMATION***						
H301	Feeding History (diet)	2.04 (49)	2.75 (44)	0.74	0.54	0.73	0.60
H302	Growth Rate	204 (48)	27s (43)	0.73	0.55	0.70	0.61
H303	Rearing Density	2.40 (53)	267 (46)	0.80	0.75	0.84	0.90
H304	Rearing Water Temperature	214 (50)	2.82 (45)	0.76	0.66	0.73	0.81
H305	Number of Ponds Used in Rearing / Types	1.85 (46)	2.80 (41)	0.66	0.61	0.65	0.66
H306	Condition Factor	1.92 (50)	2.62 (42)	0.73	0.55	0.63	0.66
H307	Disease History (Inoculations/Treatments)	2.38 (56)	267 (46)	0.69	0.75	0.67	0.94
H308	Transfer History & Methods	2.20 (51)	273 (44)	0.61	0.61	0.84	0.85
H309	Days Reared	1.88 (43)	267 (38)	0.66	0.50	0.67	0.69
H400	"'RELEASE INFORMATION***						
H401	Total Number Released	2.60 (70)	2.72 (58)	0.95	0.76	0.97	1.00
H402	Counting/Estimation Method (# Released)	2.28 (54)	2.57 (47)	0.66	0.78	0.78	1.00
H403	Release Location	2.57 (67)	2.83 (58)	0.91	0.66	0.67	0.96
H404	Release Location Coded	2.19 (48)	260 (40)	0.64	0.65	0.76	0.81
H405	Release Date(s)	2.52 (64)	2.85 (54)	0.66	0.62	0.85	0.93
H406	Release Information Coded by Brood Year	2.34 (47)	2.73 (40)	0.66	0.71	0.04	0.93
H407	Release Residualism Data	2.00 (48)	1.80 (40)	1.11	0.66	1.03	1.31
H408	Release Purpose	2.38 (52)	2.45 (47)	0.97	0.78	0.94	1.07
H419	Physiological Status @ Rel. (e.g. ATPase)	2.11 (57)	2.08 (50)	1.01	0.74	1.06	106
H410	Size @ Release	253 (64)	271 (55)	0.93	0.81	0.90	1.00
H411	Stage or Class (e.g. fry, smolt, yearling)	2.46 (65)	2.73 (55)	0.91	0.65	0.85	1.00
H412	Type (e.g. production, experimental, index)	2.31 (58)	2 60 (48)	0.89	0.76	0.62	0.96
H413	Release Transition	2.13 (40)	2.23 (35)	0.95	1.00	0.76	1.05
H414	Outmigration Timing	2.25 (55)	2.25 (48)	1.00	1.01	0.95	1.04
H415	Riverine Water Conditions After Release	1.94 (53)	2.14 (44)	0.91	0.73	0.89	0.98
H416	Riverine Habitat Inventory	1.73 (45)	2.11 (37)	0.62	0.67	0.75	0.97
H417	CWT Marking Data	2.52 (82)	281 (52)	0.80	0.65	0.91	0.96
H418	PIT Tagging Data	2.30 (50)	2.72 (39)	0.65	0.66	0.67	0.69
H419	Fin Clip Data	2.52 (50)	2.70 (43)	0.93	0.76	0.92	099
H420	Chemical Marking Data	2.13 (38)	247 (32)	0.86	0.63	0.79	0.99
H421	Natural Missing Adipose Fin Percentage	1.93 (44)	2.19 (37)	0.66	0.63	0.66	0.91
H422	Lot Number	1.03 (41)	2.76 (36)	0.69	0.56	0.66	0.74
H500	"'SURVIVAL RATES"'						
H501	Prespawning Prehatchery Survival Rate	217 (53)	2.02 (44)	1.07	0.60	1.12	1.13
H502	Prespawning @ Hatchery Survival Rate	216 (56)	2.60 (47)	0.63	0.75	0.79	0.69
H503	Egg to Fry Survival Rate	2.13 (54)	2.76 (46)	0.77	0.71	0.77	0.79
H504	Fry to Smolt Survival Rate	2.15 (55)	274 (47)	0.76	0 71	0.77	0.61
H505	Smolt Outmigration Survival Rate	2.46 (60)	1.98 (51)	1.25	1.05	1.28	1.31
H506	Smolt to Adult Survival Rate	2.56 (66)	2.11 (57)	1.22	1.16	1.26	1.19
H507	Escapement to Smolt Survival Rate	2.22 (50)	1.95 (42)	1.14	1.06	1.05	1.25
	Avenges:	2.17	252	0.67	0.75	0.85	0.93

Figure 4.1: HATCHERY PRODUCTION SURVEY CRITICALITY INDEX

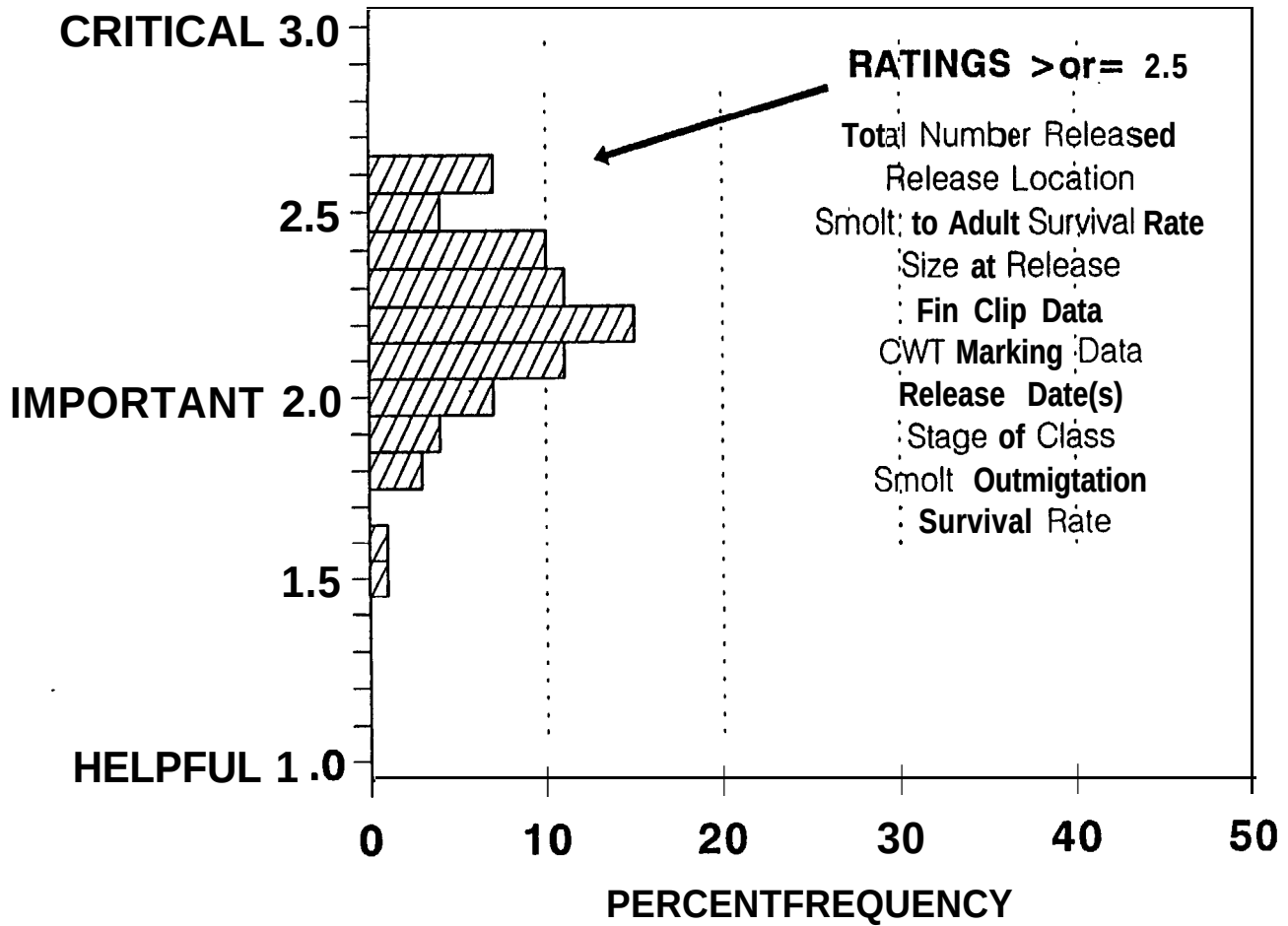
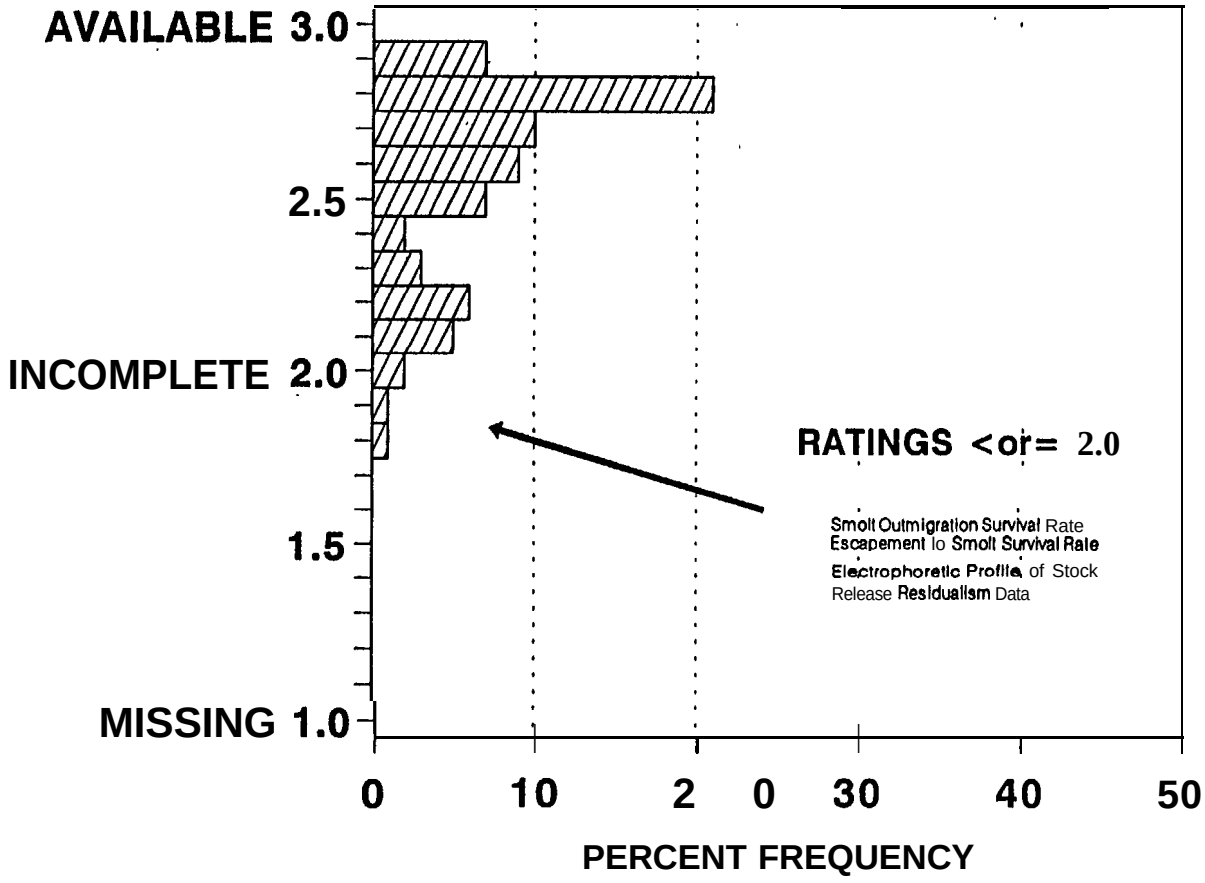


Figure 4.2: HATCHERY PRODUCTION SURVEY AVAILABILITY INDEX



In every case, fewer overall responses per data item were given describing availability than those describing needs. This may indicate many respondents were unsure about the accessibility of regional hatchery production data. As expected, those who did respond regarding availability indicated that much of the hatchery production data is either available or incomplete; few hatchery data items were regarded as missing. The overall availability index for hatchery production items ranged from 1.8 to 2.9 (on a scale of zero to three), averaged 2.52; and only 5% rated less than 2.0.

Data Gaps

Hatchery production survey data was reduced to a simple gap index in order to rank the relative importance of data items for consideration in a Coordinated Information System. The gap indexis the ratio of the criticality index to the availability index. This index could range from 0.3 (not critical & available) to 3.0 (highly critical & unavailable), but overall, it averaged 0.9, and ranged from 0.7 to 1.3 (Figure 4.3). The greatest gap index calculated was for the question regardiig *smolt outinigration survival rate,* followed by *smolt to adult survival rate, escapement to smolt survival rate, electrophoretic stock profile, release residualism data, prespawning/prehatchery survival rate, broodstock inclusion ratio of wild fish, ratio of hatchery to wild fish returning to hatchery,* and *tribal harvest at hatcheries* [Table 4.11.

The gap index was computed for responses from each of the three professional types surveyed: policy, system technical, and sub-basin technical [Appendix Tables D3-D5]. Both system and sub-basin technical respondents provided answers with very similar gap indices. Since these two groups contributed 80% of the surveys returned, the greatest data gaps are much like those detailed above for overall respondents. However, policy level respondents expressed different *data* needs, led by *smolt to adult survival rate, broodstock selection methods, escapement to smolt* and *smolt outmigration survival rates, outmigration timing, release transition* and *broodstock health conditions.*

The data gaps for hatchery production data were also analyzed by agency type and home state of all respondents [Appendix Table D2] Although relatively few surveys were returned by tribal personnel, those respondents expressed a higher data gap in 85% of the 74 data items surveyed, compared to federal and state agency staff. The greatest tribal data gaps were *broodstock selection methods, escapement to smolt survival rate, broodstock health conditions, broodstock inclusion ratio of wild fish, hatchery/wild ratio returning to hatchery, release purpose, release transition, release information coded by brood year, smolt outmigration, smolt to adult survival rates, escapement estimates of total run, broodstock total return estimate to freshwater* and *dates of spawning.*

Federal agencies expressed the highest data gap index for *elecfrophoretic stock profiles, prespawning/prehatchery survival rate, smolt outmigration survival rate, smolt to adult survival rate, outmigration timing, physiological status at release, hatchery sport and tribal harvests,* and

Figure 4.3: HATCHERY PRODUCTION SURVEY GAP INDEX - HIGHEST VALUES

INDEX	DATA ELEMENT
1.2	Smolt Outmlgratlon Survival Rate
	Smolt to Adult Survival Rate
1.1	Escapement to Smolt Survival Rate
	Electrophoretlc Proflle of Stock
	Release Residualism Data
	Prespawnlng Prehatchery Survlval Rate
	Broodstock Inclusion Ratlo of Wlld Fish
	Hatchery Tribal Harvest
	Hatchery/Wild Ratlo Returned to Hatchery
1.0	Physlologlcal Status at Release
	Escapement Estlmate
	Outmlgratlon Tlmlng
	Stock of Orlgln
	Release Purpose
	Broodstock Total Return Estimate
	Broodstock Selectlon Methods
	Hatchery Sport Harvest
	Total Number Released
	Release Transltlon
	Broodstock Health Condltlons
	Major Production Limiting Factors

size at release Respondents from state governments listed their greatest gaps as *smolt outmigration survival rate, smolt to adult survival rate, release residuulism data, escapement to smolt survival rate, broodstock inclusion ratio of wildjish, tribal harvest at hatcheries,* and *electrophoretic stock profiles.*

There were ten survey responses from outside of federal, state and tribal agencies. The highest gap indices for these respondents were *scale age versus mark age correction factor, release transition,* and *chemical marking data,* followed by *physiologic status at release.*

The gap indices broken down by state residence of respondents shows fairly similar data needs and availability throughout the region [Appendix Tables D2 and **D10-D12].** Respondents from Washington and Oregon expressed their greatest data gaps in the survival rate subsection, led by *smolt outmigration survival rate,* while those from Idaho recorded *their* highest gaps for *scale age versus mark age correction facror* and *hatchery broodstock inclusion ratio* of *wildfish* Idaho residents expressed a higher gap index for most data items in the hatchery and rearing information sections, than those from other states.

Comments were solicited for each question on the survey form. Those received were entered with survey information into a data base management system, although some longer comments were required to be tersely paraphrased into a forty character field. Appendix Table D13 lists all comments for the hatchery section of the survey. These comments will be used to refine data definitions and needs in the next phase of the CIS prototyping.

In addition to the 74 questions which appeared on the hatchery data needs survey, space was provided within each subsection of the survey for respondents to include additional data items and comments. The 41 data items mentioned in 16 surveys are listed with criticality and availability scores in Appendix Table D14.

SMEP Needs

Data needs have been identified by groups formed to address various elements of anadromous salmonid stock assessment. These groups are Power Council related and were formed for monitoring and evaluation (System Monitoring and Evaluation, SMEP), assessment (System Planning Model, SPM; Stock Assessment Report, SSR) and genetics studies. A review of their stated needs indicates that, while not covering the breadth of information in the survey, they are often more specific where the two approaches correspond and closely parallel needs identified in the survey (Table 5.1).

The greater detail in SMEP needs arises from the nature of the source documents. For instance the survey identified the need to know mainstem smolt survival rates. The System Planning Model expressed mainstem smolt survival as the combination of approximately ten separate parameters. Similar additional detail was identified for spawning population structure and ecological interactions by the Council's genetic workshops.

Conversely, the survey was more specific in the areas of habitat and hatchery release information. This was likely because this information is important to professionals whose focus is on processes within specific tributaries.

While these needs are referred to as SMEP needs, a System Monitoring and Evaluation Program has not been formed and what is called SMEP is actually a collection of reports by groups that convened to address specific aspects of the overall monitoring and evaluation problem. These groups and their findings, although not elements in an institutional structure, have been useful in identifying what information should be collected. It is encouraging to note that the data needs of these focused groups is in general agreement with survey findings.

Table 5.1. Critical data needs identified by various Columbia Basin anadromous fish activities.

DATA ELEMENT	NEED IDENTIFIED BY			
	SMEP[1]	SURVEY[2]	SSR[3]	WATERSHED MODELS[4]
DOWNSTREAM PASSAGE				
mainstem smolt survival		X		
predation rates		X		
reservoir survival	X	X		
bypass survival	X	X		
spillway survival	X			
turbine survival	X			
Fish Guidance Efficiency	X			
transport survival	X			
proportion collected for transport	X			
effects of flow/velocity	X	X		
amount of spill	X			
flow	X			
OCEAN RESIDENCE				
juvenile estuary survival	X			
natural mortality by age	X			
harvest rate by age	X			
estuary adult harvest	X			
adult estuary nat. survival	X			
UPSTREAM passage				
harvest rate by pool	X			
passage conversion	X			
wild/natural sport harvest	X	X		
Bonneville Dam count	X	X		
upper dam count	X	X		
stock-specific harvest		X		

Table 5.1. **Critical** data needs identified by various Columbia Basin anadromous fish activities **(cont).**

DATA ELEMENT	NEED IDENTIFIED BY			
	SMEP[1]	SURVEY[2]	SSR[3]	WATERSHED MODELS[4]
NATURAL PRODUCTION:				
Escapement				
total number	X	X	X	
age composition	X	X	X	
sex ratio	X	X	X	
fecundity by age	X			
size by age	X		X	
run timing	X			
morphology/morphometric	X			
electrophoretic profile	X		X	
Total smolt produced		X	X	
Carrying Capacity				
egg	X			
fry				
smolt	X	X		
potential smolt capacity	X			
Survival				
egg - fry	X	X		
fry - smolt	X	X		
egg - smolt		X	X	
smolt - smolt	X	X		
prespawning	X	X		
smolt - adult		X	X	
Hatchery Fish Performance				
spawning success	X	X	X	
survival of offspring	X	X	X	
survival of hybrids				

Table 5.1. Critical data needs identified by various Columbia Basin anadromous fish activities (cont).

DATA ELEMENT	NEED IDENTIFIED BY			
	SMEP[1]	SURVEY[2]	SSR[3]	WATERSHED MODELS[4]
NATURAL PRODUCTION:				
Ecological Interactions				
straying to other areas	X			
straying from other areas	X	X	X	
interbreeding	X			
competition	X			
predation	X			
with resident fish	X			
Habitat				
effectiveness of actions	X	X		
water diversions		X		X
water rights		X		
screened/unscreened diversions		X		
streamflow		X		
riparian condition		X		
limiting factor analysis		X		
cum. effects analysis		X		
quality	X		X	
smolt densities	X			
amt. of spawning area	X		X	
amt. of rearing area	X		X	
temperature				X
large woody debris				X
fine sediment				X
embededness				X
channel unit type				X
flow		X		X

Table 5.1. Critical data needs identified by various Columbia Basin anadromous fish activities (cont).

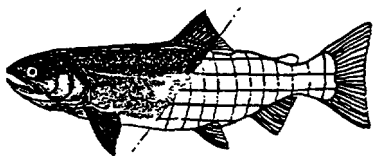
DATA ELEMENT	NEED IDENTIFIED BY			
	SMEP[1]	SURVEY[2]	SSR[3]	WATERSHED MODELS[4]
HATCHERY PRODUCTION:				
Escapement				
total number	X	X	X	
age composition	X		X	
sex ratio	X		X	
fecundity by age	X			
size by age	X		X	
run timing	X			
morphology/morphometric	X			
electrophoretic profile	X			
Carrying Capacity				
egg	X			
smolt	X			
Survival				
outmigration		X		
smolt - adult	X	X		
Release Information				
total number released	X	X	X	
release location		X		
release dates		X		
size at release		X		
stage/class at release	X	X		
Tagging Information				
CWT data		X		
fin clips		X		
Other				
supplementation	X	X		

1 As identified by the System Planning Model, draft System Monitoring and Evaluation Plan tables, and documents from the series of NPPC Genetic Workshops.

2 The CIS user survey described in Weber, et al 1992.

3 Hatch, et al 1992 (in preparation). These are updates of the 1985 'Stock Assessment Reports (Howell, et al 1985).

4 A synthesis of key variables from various models described in McCullough (1992) (manuscript).



CONCLUSIONS

The Coordinated Information System is envisioned as a way to describe existing information; identify information needs; and provide a method to access existing information. The survey's emphasis on specific data elements allowed the creation of a cross-reference coding system that will serve as a framework for identifying existing information in the Basin. Survey responses for individuals that collected, maintained or were the contact for specific data elements were summarized in the Data Item Directory (O'Connor et al. 1992). At this stage the Data Item Directory is merely a pointer system to information. Data access systems could be developed for some of the more important of these data sets, depending on the future scope of CIS (Allen et al. 1992).

The survey was less successful at identifying the Basin's needs for summary data, and the steps necessary to construct summary data bases. Some of these needs are defined in the draft System Monitoring and Evaluation Program (SMEP) and in the formats for the Stock Assessment Reports. The CIS team recognizes that full definition of needs will be an ongoing, iterative process with potential CIS users.

General Needs

The Columbia River Basin needs a coordinated communication hub and network of fisheries data and text information. Researchers, including the System Monitoring and Evaluation Program of the NPPC, need a hub of system-wide information on anadromous salmonid production, harvest, stock status, land and water management activities. A network to provide a directory of the location and content of additional basin information sources, and provisions for coordinated data collection, retrieval, sharing, and dissemination is needed.

Basin managers, planners, and policy-makers need a source of information on on-going and planned research efforts, policy decisions, and the visions and goals of the involved federal and state agencies and tribes. Within the basin, the Western Regional Aquaculture Consortium Information Center at the University of Idaho, has expressed a wish to be kept current on the progress and developments of the CIS delivery system with an eye to cooperation and a possible linking between the WRAC and a CIS. The Klamath Restoration Program, citing the information problems in the Klamath Basin, has indicated that the CIS is providing technical leadership and a model for the Klamath Program.

The self-defined needs of potential users for an information delivery system include: a

readily available, coordinated directory and source of information which utilizes a transparent, user-friendly system emphasizing convenience, timeliness, accuracy, speed, and reliability in the retrieval, exchange, and dissemination of information. The system should serve equaIly users with high access to and comfort with electronic technology and those who prefer telephones and paper. The system should be designed to provide service to the breadth of the Columbia Basin and to the diversity of needs, purposes, and jurisdictions. The system should be able to support shared planning, shared agendas, and shared vision.

An examination of the library and fisheries literature as well as other information resources accessible in the region have defined the need for:

- bibliographical, physical, and intellectual access to recorded knowledge, existing databases, and related publicly and commercially published information;
- a coordinated effort to collect and preserve awareness of and sources of basin-wide memory and learning;
- access to hitherto inaccessible information, the basin grey literature, consistent with current and anticipated research needs;
- access to on-going research;
- a regional hub, a gateway and network linking basin information users and producers.

System Information Needs

Many of the needs expressed for System Information are, not surprisingly, those that pertain to mainstem survival and those related to assessing the efficacy of management measures being proposed to increase the survival of juvenile and adult salmonids through the mainstem projects. System Information can be characterized as incomplete although some survival values, at least for some stocks, are missing altogether. A general conclusion might be that the more difficult a parameter is to estimate (either in terms of money or sacrificed fish), the less available it is. And based on the experience of. individuals involved in mainstem assessment, the data that are available data are found in a myriad of places and there has been no attempt to consolidate or summarize them.

Natural Production Information Needs

The survey identified a high level of need for natural production and habitat data in the Columbia Basin.

In general, a greater criticality was expressed for natural production data elements than for habitat data elements. The highest criticality of need for natural production data was expressed in areas of production, survival at various life stages, subbasin harvest and influence of hatchery fish. Highest criticality ratings for habitat data were related to irrigation diversions, grazing and cumulative effects analyses. All data elements were

perceived as critical by at least some workers in the basin.

Most data elements for both natural production and habitat were perceived as incomplete and inadequate.
The survey identified relatively large'data gaps, particularly for natural production data. For the most part, the largest gaps were for data elements with high criticality indices.
Data gaps identified by the natural production survey were consistent to a large degree with the "critical uncertainties" identified in the Integrated System Plan (CBFWA 1991). The Integrated System Plan (ISP) noted that " (a)s the transition is made from system planning to involvement in the System Monitoring and Evaluation Program (SMEP), the most immediate task is the delineation of information . . . needed to accurately assess fish stocks".

Data gap results from the natural production survey support the list of critical uncertainties identified in the ISP. For tributary production of natural stocks, the ISP listed the following critical uncertainties: 1) smolt capacity, 2) effects of how (habitat) enhancements in a subbasin change its smolt capacity, 3) egg-to-smolt survival, 4) smolt-to-smolt (inbasin) survival, 5) prespawning survival, 6) reproductive success of returning hatchery adults, and 7) hatchery fish impacts on natural populations through interbreeding and conspecific and interspecific competition. All the above received high gap index ratings in the survey.

The ISP did not specifically address the habitat data needed to refine estimates of smolt capacity and tributary survival. Data gap results from the habitat survey provide only limited additional insight on how to "get there from here". Several of the written comments alluded to a continuing problem of lack of standardization and coordination of data in the basin. The problem seems particularly chronic in the area of habitat data.

At least two regional programs, and several state programs, have the potential to provide additional structure and standardization to habitat monitoring and inventory data. These regional programs are the CIS Watershed Classification (Objective 5), and the U.S. Forest Service Anadromous Fish Policy Implementation Guide (PIG) for Regions 1, 4 and 6. Both attempt to address the questions of existing and potential carrying capacity and land management impacts.
The habitat portion of this survey contained most of the data elements being considered for inclusion in monitoring and inventory from the above two programs (K. Over-ton, USFS and D. McCollough, CRITFC, personal communication). Survey responses for habitat data needs and gaps also identified some of these data elements, but results were not as distinct as in the natural production data survey.

Hatchery Production Information Needs

Results from the CIS Needs survey indicate that hatchery production data are of high interest and generally moderate to good availability. Since many of the data items in this section are regularly collected and maintained in 'formal' datasets, high availability of data is not

surprising. Still, some respondents indicated that certain items were less than completely available. In many cases, we felt that this was more a question of data accessibility than availability. Resource management agencies are generally budgeted to collect, maintain, and provide their data internally as a first priority, and dissemination of those data to non-agency users may not occur regularly **or** sufficiently when funds are at a premium. A major benefit of a centralized CIS to store regionally useful hatchery production data would be realized if commitment is made by data collecting agencies to provide the time and staff expertise needed to prepare such data to meet regional criteria and provide them regularly.

According to the data gap analysis performed, smolt outmigration survival rate, smolt to adult survival rate, and escapement to smolt survival rate are the three most needed and least available items related to hatchery data. These items are not directly collected pieces of data, but result from analytical assessment of data that can be collected. However, some of the pieces needed for such analysis cannot be collected on the hatchery grounds by existing staff at the time of release. In order to provide this information, agencies must have access to data collected either by others later in the migration life of the fish, or by their staff several years later at the hatchery rack. Since collating these data and analyzing them are not the first priority of hatchery production programs, data users must rely on the efforts and priorities of others in the resource agency who have similar needs. For these reasons, generating historical data for such rates will be difficult. However, future collection is feasible, given a high enough priority on standardizing these annual analytical assessments and a standard format and system in place for storing and maintaining these data. This is the major benefit a Coordinated Information System can provide to hatchery data users.

As information needs of the Columbia River region become common knowledge among all regional resource management agencies, we hope that a focus on providing information for assessing success of production programs begins to take precedence over the expediency of simple data provision. Certainly such assessment is of interest to fish-producing agencies, even if some of the parts of the puzzle need to be estimated or inferred, rather than directly measured. The reluctance of agency staff to share such internal analyses publicly must diminish if true information-sharing is to be realized in the region.

SMEP Information Needs

Information needs expressed in Council documents are similar to those identified in the survey. They are usually identified in greater detail because of the source (e.g. model parameters, genetic reports), but are satisfied by a relatively small set of core data which also meets many of the needs identified in the user survey. Overall, it was judged that there were no inherent inconsistencies in information needs expressed by any of the methods used.

RECOMMENDATIONS

1. Where needs identified by the survey match needs from other, management oriented entities, their collection and dissemination should be given a high priority.

2. Criticality indices from the needs survey should be used primarily as a general guide to the types of information that should be incorporated into a CIS.

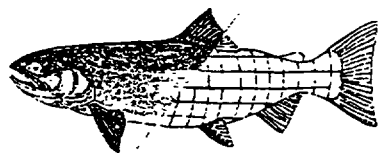
3. The "pointer" system (data catalog) to data items and data sets developed in Phase II (Data Catalog Report, O'Connor et al. 1992), should be extended in Phase III.

4. Retrieval methods should be prototyped for the more critical existing data sets for system, natural production (including habitat) and hatchery production data.

5. Potential CIS summary information should be developed and prototyped in Phase III using a development team with focus group(s) for system, natural production, and hatchery data (Technical and Administrative Options Report, Allen et al. 1992).

6. The Phase III focus group(s) should consist of important Columbia Basin information users from the fish and wildlife agencies and tribes, Northwest Power Planning Council, Bonneville Power Administration, land management agencies, and others.

7. Information needs of the Northwest Environmental Data Base, System Monitoring and Evaluation Program, Stock Assessment and system models being developed for the Endangered Species Act, NPPC Phase III and the System Operations Review processes should drive prototype development.



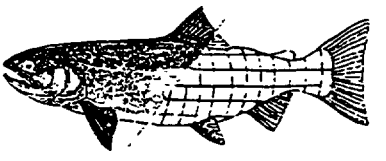
SECTION II: REFERENCE NEEDS

INTRODUCTION

Although each of the three states supports academic libraries at universities that offer graduate programs in fishery science, supports a public library in a major urban center, and has access to various national information services, these resources are not readily available to most of the technical and policy groups and- individuals involved in managing Columbia Basin anadromous fish resources. This section of the information needs report describes the non-numeric information needs of these individuals.

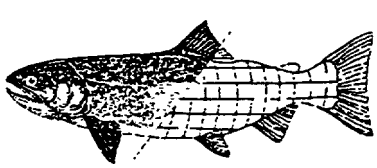
Within the Columbia Basin, several significant bodies have identified the need for a Coordinated Information System. Reports, amendment documents, and anecdotal comments from members of system-level bodies have specified the need for various types of non-numeric information. A CIS could provide information to support adaptive management of the Northwest Power Planning Council's (NPPC) Fish and Wildlife Program, implementation of program monitoring and evaluation, and could assist tracking of planned and ongoing activities through coordination with an improved Bonneville Power Administration's (BPA) Project Management Information System (PMIS). These needs include:

- Capturing the text information in the basin;
- System-wide information to promote resource coordination and support decision-making;
- Learning from experience through analysis and interpretation of text materials;
- Institutionalizing learning, profit from adaptive management, and increase productivity;
- Enhance basin opportunities.



METHODS

Identifying needs for reference services in the Columbia Basin relied most heavily upon an analysis of the General Comments section of the CIS needs survey. Comments from the survey defined the content and delivery needs. · NPPC reports and discussions with staff helped clarify and expand on issues raised by survey comments.



RESULTS

Literature

The information needs of the Columbia Basin range from specific kinds of information to the definition of a system. A genetic content focus to support "decision criteria and conceptual relationships" has been identified (Riggs in Allendorf 1991). Coordination of the large body of existing information requires a "synthesis of information into a form" that will support "enhanced, better-coordinated research efforts (Hirtle 1989, Thomas 1991)." Consistent availability, reliability, timeliness, and accessibility have been stressed (KIamath 1991, Riggs 199 1, Thomas 1991). Planning and evaluation of successful fisheries research have been linked to the presence of supporting information and communication systems (Klamath 1991, Pinkerton 1991).

Survey

The survey of potential users of a Coordinated Information System yielded comments ranging from standards/principles requests, to specific and general content needs, to preferences for information delivery modes. Comments in this section listed specific data needs such as stock, stream, or data producer. A detailed discussion of data and stock comments appears in other sections the Needs Assessment Report.

Analysis and categorization of comments dealing with other types of information needs from the General Comments Section revealed respondent needs for timely data, "real time" data, updated data, and data that appeared in the same format. One respondent characterized the existing "exchange structure" as "catch as catch can" and "shared in pieces." The need for "the big picture" appeared as well as requests for data that were "basin-wide," covered "historical" records, and were available in "summary" form. The importance of documentation surfaced focusing upon not only source information but the dangers of data "cited without limitations." Respondents characterized a desirable delivery system as "fast, " "easy to use," and "reliable."

The comments **f'rom the** General Comments section of the survey document also addressed the content needs of a CIS. Surveys that included comments in this section expressed the need to know:

- What information is available
- Where to get it

One Idaho respondent, replying to the question on information sharing, replied, "What information sharing? the information you need is probably out there but having (sic) to go through hell to find out who has it." An Oregon respondent requested a "Who's Who." A Washington respondent wanted to know "how many folks are doing it out there."

Survey responses indicate that 75 per cent of the information that Basin respondents regularly seek and use is in text form. Anecdotal reports indicate that the majority of this text material centers on basin-issues and is set in the basin, the product of basin researchers. The majority of the researchers are state and federal agency personnel and academics. A certain portion of these basin research reports, primarily federal agency, may travel through established publication channels and thus are available through indices, professional journals, and other media. The largest portion of these reports, known as the "grey literature of the Columbia River Basin," are not indexed and remain in agency files. Respondents noted that much of the agency literature does not appear journal publications.

Responses in the General Comments section pinpointed specific text or reference information that is not available. In addition to a general "Who's Who" and "Who has What?" information, respondent needs include a "catalog of computer databases" and a "field guide" to the Columbia River Basin, and a "single abstract/subject index to gather complete information on Columbia Basin stocks and projects." Basin scientists emphasized the need for timeliness in both policy and research information as they seek to avoid both duplicative efforts and the threat that "planned actions" could "compromise" on-going or in-progress efforts.

Respondents requested five other functions of a CIS.

- better access to other agency and provincial technical briefs.
- a source of information, updated regularly, covering agency policies on various issues.
- an information source on anticipated or in progress research, such as the Bonneville Power Administration's Project Management Information System (PMIS).
- from information producers, a referral avenue to avoid their providing same information "over and over."
- an unbiased, neutral clearinghouse for information that would allow producers to "sidestep political objections to data sharing or political filters on data."

In addition to types of information or specific categories of information, comments in this section of the survey addressed the need for a coordination of Basin policy and actions that an information system can support. Calling these "partnership," "teamwork within and among agencies," agency "commitment* and "dependable funding," respondents expressed the need for shared "long-term thinking and planning," a "global agenda," and "vision" for the Columbia Basin.

Comments were listed, classified, and grouped according to the following categories, that are followed by comments from the surveys.

The need for communications and information sharing interface:

- consistent data and collection methods, reporting formats,
- complete data, continuous data, updated data,
- formatted, digitized data, a CD.

The need for information exchange and sharing:

- easy access to data from other agencies,
- ♏♋•♎ ♦□ ◆•♏♐
- •□♏♏♎♎ access.

The need for centrally available source and directory of information:

- to know what data is available, where, and how to get it,
- to know if it is electronic or in a box somewhere,
- to obtain information that is timely, reliable and accurate,
- data are incomplete because sharing is ad hoc, informal,
- need to know data limitations, need documentation,
- need storage and retrieval,
- central source, point of contact,
- easy-to-use practical complete database for fish-related data,
- tools and data to answer (genetic) questions,
- central authority for guidance and funding,
- agency commitment to partnership, reciprocity, and funding,
- would like to avoid providing same information over and over,
- sidestep political objections to data sharing or political filters on data.

The need for access to a broader range of information:

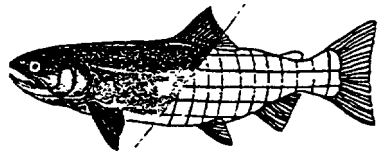
- summary data,
- historical data,
- basin-wide data,
- data linking sub-basins to basin-wide,
- data specifics.

Visits, Consultations

During the research period, several visits and consultations resulted in volunteered statements on the need, in the Columbia River Basin and elsewhere, for a coordinated information

system. The experiences of the Klamath Restoration Program testify to how easily information can be lost. Because of that loss, studies may be, by accident or design, repeated. The sole source for much of the information needed for the Klamath Program are the University of California, Berkeley archives. There, fortunately, the one extant copy of the needed documents is available for photocopy.

The Fisheries Division of the Montana Department of Fish, Wildlife, & Parks provides a second example of the difficulty of both finding and obtaining information. The department has not created a central set of files, records, or reports, nor does a complete set of reports exist at the Montana State Library. The newly-hired department librarian responds to researcher's requests by telephoning the original researchers to request a copy of their reports. Because certain individuals have been with the department for many years and function as an institutional memory, the librarian has been remarkably successful in tracking down former staff members to obtain copies of research reports. Montana FWP is building a library collection by telephone and photocopier.



CONCLUSIONS

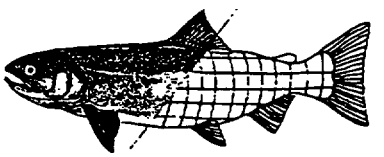
The Columbia River Basin needs a coordinated communication hub and network of fisheries data and text information. Researchers, including the System Monitoring and Evaluation Program of the NPPC, need a hub of system-wide information on anadromous salmonid production, harvest, stock status, land and water management activities. Researchers need a network to provide a directory of the location and content of additional basin information sources, and provisions for coordinated data collection, retrieval, sharing, and dissemination.

Basin managers, planners, and policy-makers have expressed a need for a source of information on on-going and planned research efforts, policy decisions, and the visions and goals of the involved federal and state agencies and tribes.

The self-defined needs of potential users for an information delivery system include: a readily available, coordinated directory and source of information which utilizes a transparent, user-friendly system emphasizing convenience, timeliness, accuracy, speed, and reliability in the retrieval, exchange, and dissemination of information. The system should serve equally users with access to and comfort with electronic technology and those who prefer telephones and paper. The system should be designed to provide service to the breadth of the Columbia Basin and to the diversity of needs, purposes, and jurisdictions. The system should support shared planning, shared agendas, and shared vision.

The CIS user survey and other information resources accessible in the region have defined the need for:

- bibliographical, physical, and intellectual access to basin grey literature knowledge, existing databases, and related publicly and commercially published information;
- a coordinated effort to collect and preserve records of basin research to create awareness of and a source for of basin-wide memory and learning;
- access to hitherto inaccessible information consistent with current and anticipated research needs;
- identification of planned and ongoing research and production projects;
- a regional communications network linking basin information users and producers for exchange and sharing of current and anticipated research and policy developments.

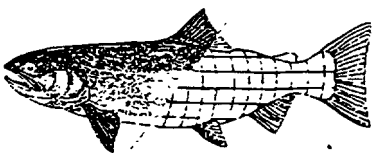


RECOMMENDATIONS

- Available literature references on Columbia River anadromous fish should be compiled into a single reference catalog,

- Present and planned research and production projects and policies affecting such projects should be compiled into an activity catalog,

- Efficient methods of maintaining and sharing the reference and activity catalogs should be developed.



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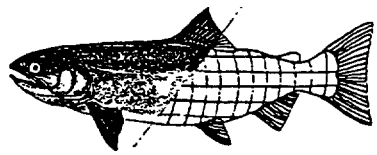

APPENDIX A - USER SURVEY AND GUIDE

Survey Guide

Survey

SURVEY GUIDE
COORDINATED INFORMATION SYSTEM

INTRODUCTION

The CIS data survey was conceived as a means of identifying types and sources of available data pertaining to Columbia River anadromous salmonids and identifying the data needs of those involved in salmonid research and management- Survey results will be used to develop a data dictionary as well as to identify data gaps. This guide is intended to establish. procedures and conventions for conducting the survey so that the information will be collected consistently and completely.

PROCEDURES

During the survey process, one or preferably two CIS personnel will establish a dialogue with one or more individuals from a given agency or organization and code survey forms according to the responses generated, It is seen as desirable to code both the hardcopy and electronic versions of the form but the electronic form is essential-

The survey forms consist of four areas that are separate to some extent. The four areas are:

1. General Information - background information regarding the person being interviewed.

2. System Information - mainstempassage data and more general information potentially of interest to those with a system perspective such as those who deal with the Fish and Wildlife Program.

3. Natural Production Data - information regarding the fish in their natal subbasin and regarding their habitat. Includes habitat deta.

4. Hatchery Production Data - analogous to above but pertaining to hatchery fish.

The survey has been divided into the four areas in part because of their having different data structures and in part to direct the participant to areas where he or she feels a de-sire to provide or obtain information, While no effort should be made to discourage someone from answering any portion, neither should any individual feel compelled to complete sections in which they have no particular expertise (i.e. a harvest manager should not be encouraged to complete the System Information section.)

CODING

A response be categorizedaccording to importance, availability and whether the participant is a contact person for the data with the use of a three character code. The first character is a number denoting one of three categories denoting the relative importance:

3 = Critical because it is mandated by treaty or other international agreement or because the presence of the data item could profoundly affect fisheries management.

2 = 'Important. Affecting other agreements or (potentially) affecting routine management decisions.

1 = Helpful. Not in the mainstream of fisheries management but potentially useful or useful on an occasional basis or for inhouse use.

The second character describes the availability of the data from the perspective of the participant:

A = Available and Adequate data used currently or in the past by the person or colleagues in the case of group efforts. This information impacts one's duties. Enter source(s) in comments section.

I = Inadequate or Incomplete. Applies to incomplete data series and those whose collection leave something to be desired; Comments on the reason for or extent of incompleteness may be entered.

M = Missing altogether. Desired but not available. The lack of information impacts one's duties. Comment if necessary.

The third category indicates whether or not the participant collects, maintains or is a contact person for,a particular data set:

Y = Yes, I-collect or am a contact person for the data set.

N = No (or blank), I am not a contact person for that data set.

Note that each of the three data sections of the survey (Natural and Hatchery Production, and System Information) are comprised of numerous subheadings, The participants may respond to the section header if they choose rather than respond to each data item in the section, Note also that lines within the section may be ignored by the participants but any line attempted must contain information on both usefulness and availability. In other words, an individual cannot rate an item critical and then say they don't know about its availability and leave a blank. In that case the data are "missing" from the perspective of the participant.

GENERAL COMMENTS

Given the volume of paper being generated it will be important to adhere to a coding system in order to keep interviews straight. Each form. will have a space for both the interviewer and interviewee and a space for a unique code. The unique will consist of a letter that designates the organization of the interviewer and a three integer serial number (ie 0399.) The letter code is as follows:

I = Idaho
C = CRITFC
0 = Oregon
F = Washington Fisheries
w = Washington WildLife
S = Sho Bans
V - ColVilles

The three integer serial number arrangement will be up to the individuals within the organizations.

With regard to the approach to be taken, get to know the form as much as possible before beginning the survey process. If some of the information in the general section can be filled out before an interview, try to do so. Also keep in mind that this is the first step in developing a data dictionary so try to include as much information on the various sources of data as is practical.

Interview #_____

Interviewer _____

Coordinated Information System
Anadromous Fish
General Section

Name: _____

Agency/ Affiliation: _____

Title: _____

Phone: (-) - - - - _____

Address: _____

_____

Zip: _____

fax: (____)____ - _____

Please identify policy and technical groups on which you have served or are serving, and **involvement in** modeling relative to the Columbia Basin and anadromous fish:

Name of Group/Model	Currently Serving	Group/Model Level: Policy	System Technical	Subbasin Technical
_____	cl	☐	0	☐
_____	☐	0	0	0
_____	0	0	0	0
_____	☐	☐	0	0
_____	0	0	0	0
_____	☐	☐	0	0
_____	0	cl	0	0
_____	0	0	0	0
_____	cl	0	0	0
_____	☐	0	0	0
_____	0	0	0	0

interview #_____

Is your current position primarily: 0 Research/Monitoring 0 Management

0 Planning 0 Hatchery Production ☐ Other: _____

Names of current program(s) or project(s):

_____

_____

_____

_____

_____

In which of the following anadromous areas have you worked?

☐ Smolt Passage ☐ Harvest ☐ Hatchery Production ☐ Habitat

0 Adult Passage ☐ Supplementation ☐ Natural Production ☐ Planning

0 Other: _____

Interview #_____

Information Collectors

Do you collect data? ☐ Yes ☐ No

If yes, what type?

0 Smolt Passage ☐ Harvest 0 Hatchery Production 0 Habitat

0 Adult Passage 0 Supplementation ☐. Natural Production 0 Planning

☐ Other: _____

How are data from your program(s) or project(s) reported?

0 Annual Reports 0 internal Agency Database 0 Professional. Meetings

0 Internal Agency Files 0 Personal Database 0 Personal Conversations

0 Personal Files 0 External Agency Database 0 Professional Journals

☐ Other: _____

Do you manage, update, or maintain your program(s)/project(s) data? 0 Yes ☐ No ☐ Par tial

Is there a "data manager" or other key person who Is responsible for your data? 0 Yes ☐ No

II yes,

Name: _____ Address: _____

Agency/ Affiliation: _____ _____

Title: _____ zip: _____

Phone: (____) ____ - _____ Fax: (____) ____ - _____

Interview #_____

Information Users

What type of data do you use?

0 Smolt Passage ☐ Harvest Hatchery ☐ Production ☐ Habitat

☐ Adult Passage 0 Supplemental Natural ☐ Production 0 Planning

0 Other: _____

What years of data are important to your typical analysis'?

0 Pre 1940's 0 1940's ☐ 1950's 0 1960's ☐ 1970's 1980's +

What reporting methods do you typically access for your data needs?

0 Annual Reports ☐ Internal Agency Database ☐ Professional Meetings

☐ Internal Agency Files ☐ Personal Database ☐ Personal Conversations

0 Personal Files ☐ External Agency Database ☐ Professional Journals

0 Other: _____

Please identify major regional and state data sources you access:

Regional	Idaho	Oregon	Washington
☐ Northwest Environmental Database	0	IRIS ☐	ORIS ☐ WARIS
☐ STORET			
☐ Coded Wire	0 _____	0 _____	0 _____
☐ Pit Tag			
☐ Fish Passage	Center _____	0 _____	0 _____ 0 _____
☐ CROHMS (Dam	Counts) _____	0 _____	0 _____ 0 _____
☐ PMIS (BPA)			
0 Other: _____ 0	_____	0 _____	0 _____
0 _____			

00 you rely on others In your agency to access computerizeddata? ☐ Yes, entirely. ☐ No ☐ Partially

Name: _____ Name: _____

Address: _____ Address: _____

_____ _____

Phone:(_____) - Phone:(_____) -

Interview #_____

What computer hardware do you use to maintain and analyze your data?

☐ IBM Cornpatible ☐ Macintosh ☐ Mini-Computer ☐ Mainlrarne Computer

Please describe the hardware you use/depend on:

IBM Compatible _____

_____

Macintosh _____

_____

Minl-Compu ter _____

_____

Malnlrame _____

_____

Do you have a modem? ☐ Yes ☐ No

Describe (or list data manager): _____

_____

Please identify the computer software you currently use:

Operat Ing Sys tem:	☐ Other: MS-DOS	☐ OS/2	☐ UNIX	_____
Database:				
Word Processing:				
Spread Sheet:				
Communications:				
Ot her:				

Interview #_____

Note:
The remainder of this survey has been color coded into four distinct and more detailed sections titled System Monitoring, Hatchery Production, Natural Production, and Concluding Questions, Before starting any of these sections, we have several quest'ions to ask you first.

Please identify major species' of interest to you by checking appropriate boxes.

	Wild/Natural	Hatchery
Spring Chinook	☐	0
Summer Chinook	☐	0
Fall Chinook	cl	0
Tule	0	0
Upriver Bright	0	0
Coho	☐	0
Sockeye	0	0
Chum	0	☐

	Wild/Natural	Hatchery
Summer Steelhead	☐	☐
A-Run	0	0
B-Run	0	0
Winter Steelhead	☐	0

'Please use comment lines on subsequent pages for specific data interests in addition to these species.

'If you are interested primarily in certain geographic areas, or locations, please identify below:

Natural Production	Specific Hydrologic Units/ Subbasins/Streams of Interest	Hatchery Production
0 Entire Columbia Basin	_____	0 Entire Columbia Basin
0 Idaho (all)	_____	0 Idaho (all)
0 Oregon (all Columbia R.)	_____	0 Oregon (all Columbia R.)
0 Washington (all Columbia R.)	_____	0 Washington (all Columbia R.)
0 Mainstem Columbia/ Snake only	_____	0 Specific Hatchery(ies)
0 Ocean	_____	_____
0 Other (specify) _____	_____	_____

Interview #_____

Name: _____

System Monitoring

Subject Summary or Analysis	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/ Incomplete A=Adequate/ Available	Check for data you collect, maintain, or are contact person!	Comments
3100 Fish Effectiveness Program Data	0	0	0	
3101 Water budget.	☐	☐	0	
3102 Screens (FGE)	0	0	0	
3103 Transportation	☐	0	0	
3104 Upstream passage Improvement	☐	☐	0	
3105 Habitat Improvement	0	0	☐	
3106 Program hatchery production	0	0	0	
3107 Hatchery effectiveness	☐	☐	0	
3108 Supplementation	0	0	0	
3109 Genetic risks	☐	0	0	
3110 Contribution to doubling goal	0	cl	0	
3111 Program costs	☐	☐	0	
3199	☐	0	0	
3199	0	0	0	
3200 Escapement and Spawners	0	0	0	
3201 Columbia R. mouth.	☐	0	cl	
3202 Bonneville Dam	0	0	0	
3203 To upper dam .	☐	0	☐	

Interview #_____

Subject Summary or Analysis	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments
8200 Escapement and Spawners - continued				
8204 By major tributary	LJ	☐	LJ	
8205 By indicator stream	0	0	0	
8206	0	0	0	
8207	0	0	☐	
8300 Adult Dam Loss/Conversion				
8301 Bonneville to McNary	☐	0	0	
8302 McNary to Ice Harbor	☐	0	0	
8303 Ice Harbor to Lower Granite	☐	0	0	
8304 McNary to Priest Rapids	☐	0	0	
8305 Priest Rapids to mid-Col dams	0	0	0	
8306	0	☐	0	
8307	0	0	0	
8400 Ocean Harvest				
8401 Catch	0	0	0	
8402 Harvest rate	0	0	0	
8403 Allocation by fishery	0	0	0	
8404 Stock-specific (please comment)	☐	0	0	

Interview #_____

Subject Summary or Analysis	Data Needed 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments
8400 Ocean Harvest - continued				
8405 Economics/social	☐	0	☐	
8409	0	☐	☐	
8409	☐	0	0	
000 Inriver Harvest				
8601 Catch - Zones 1-6	☐	0	0	
8602 Harvest rate - Zones 1-6	☐	0	0	
8603 Allocation by fishery	☐	0	0	
8604 Stock-specific (please comment), _____	☐	☐	0	
8605 Economics/Social	0	0	0	
8609	0	0	0	
8609	☐	☐	0	
8600 Subbasin Harvest				
8601 Catch	0	0	0	
8602 Harvest rate	0	0	0	
8603 Allocation by fishery	0	0	0	
8604 Stock-specific (please comment)	☐	0	0	
8605 Economics/Social	☐	0	0	

Interview #_____

Subject Summary or Analyala	Data Needed 1=Helpful 2=Important 3=Critical	Existing Data M=Missing I=Inadequate/ Incomplete A=Adequate/ Available	Check for data you collect, maintain, or are contact person:	Comments
3600 Subbasin Harvest - continued				
3699	☐	0	0	
3699	0	cl	☐	
3700 Preamolt Produotion				
3701 Carrying Capacity	☐	0	0	
3702 Egg to par r survival	☐	0	0	
3703 Potential carrying capaolty	☐	0	0	
3704 Productlon levels by subbaaln	☐	0	0	
3705 Production levels - Indicator or other stocks	0	0	0	
3799	☐	0	0	
3799	0	0	0	
,800 Smolt Produotion				
3801 Carr ying capacity	0	0	☐	
3802 Egg to smolt survival	☐	0	0	
3803 Potential carrying capacity	☐	cl	0	
3804 Productlon levels by subbasin	0	0	0	
3805 Productlon levels - Indicator or Other stocks	0	0	0	

Interview #_____

Subject Summary or Analysis	Data Needs: 1=Helpful 2=Important A=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are aware of exist nearby	Comments
800 Small Production - continued				
806 Hatchery releases	☐	☐	cl	
809	☐	☐	☐	
899	☐	☐	☐	
900 Smolt Passage and Survival				
901 Reservoir survival	0	0	☐	
902 Smolts arriving at dams	☐	☐	0	
903 Number transported	☐	0	☐	
904 Transport benefit ratio	0	☐	0	
905 Fish guidance efficiency	☐	cl	0	
906 Bypass survival	0	0	☐	
907 Turbine survival	0	0	0	
908 Predation rates	0	☐	☐	
909 Total smolt survival	0	0	0	
910 Arrival timing - aggregate stocks	☐	0	0	
911 Arrival timing - indicator stocks	☐	0	0	
912 Flow/velocity effects	☐	0	0	
913 Spill effects	☐	☐	0	

Interview #_____

Subject Summary or Analysis	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments
8000 Smolt Passage and Survival - continued				
3014 Gas supersaturation effects	0	0	0	
3000	☐	0	0	
3000	☐	0	0	

Interview #_____

Name: _____

Hatchery Production

Parameters	Data Needs: 1-Helpful 2-Important 3-Critical	Existing Data: M-Missing I-Inadequate/Incomplete A-Adequate/Available	Check for data you collect, maintain, or are contact person!	Comments and details
H100 Escapement, Spawners, and Subbasin Harvest	0	0	0	
H101 Facility where spawning occurs.	☐	0	0	_____ Coded?_____
H102 Sex ratio of returning adults	☐	0	0	
H103 Sex ratio of spawners used	☐	0	0	
H104 Escapement estimate (total run-all stocks)	0	0	0	
H105 Broodstock total return estimate (to F.W.)	0	☐	0	
H106 Broodstock age structure.	☐	0	0	
H107 Broodstock fecundity	0	0	0	
H108 Broodstock selection methods.	0	0	0	
H109 Broodstock health conditions	0	0	0	
H110 Hatchery/wild ratio returned to hatchery	☐	0	0	
H111 Broodstock inclusion ratio of wild fish	☐	0	0	
H112 Broodstock collection type	☐	0	0	
H113 Date(s) broodstock returned to hatchery.	0	0	0	_____ Stat. Wks?_____ Historical Summary?--
H114 Dates of spawning	☐	0	0	
H115 Length Frequency of spawners by sex	☐	0	0	

Interview #_____

Parameters	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments and detail.
H100 Escapement, Spawners, and Subbasin Harvest - continued				
H117 Weight of spawners	cl	0	0	
H118 Stock of origin	☐	cl	☐	
H119 Electrophoretic profile of stock	☐	0	cl	Meristics? Morphometrics?
H120 Repeat spawning percentage	cl	0	0	
H121 Broodstock mark return count	☐	0	☐	
H122 Scale age vs. mark age correction factor	☐	cl	cl	Jack % Jack types Size of lost/No Tags
H123 Hatchery aporl harvest	☐	0	0	
H124 Hatchery tribal harvest	☐	0	0	
H199	0	0	0	
H199	0	0	0	
H200 Hatchery Information	☐	☐	☐	
H201 Hatchery/facility where eggs were hatched	☐	0	0	
H202 Hatchery/facility where fish were last reared	0	0	0	
H203 Facilities where fish were previously reared	0	0	☐	
H204 Hatchery number(s) or code(s)	0	0	0	Particular coding?
H205 Source of water at hatchery	0	0	0	
H206 Hatchery water quantity	0	0	0	

Interview #_____

Parameters	Data Needs* 1-Helpful 2-Important 3-Critical	Existing Data: M-Missing I-Inadequate/ incomplete A-Adequate/ available	Check for data you collect, maintain, or are contact person	Comments for data.
H200 Hatchery information - continued				
H207 Hatchery water quality	0	☐	0	Specify:
H208 Hatchery effluent quality	0	0	0	
H209 Hatchery capacity	☐	0	0	
H210 Hatchery methods/procedures	☐	☐	0	
H211 Published hatchery goals	0	☐	0	
H212 Major limiting factors at hatcheries	0	0	0	
H213 Annual hatchery budgets	☐	cl	0	
H200	☐	0	0	
H200	0	0	0	
H300 Rearing information	0	0	cl	
H301 Detailed feeding history (diet)	0	0	0	
H302 Growth rate	0	0	0	_____ Units per _____
H303 Rearing density	☐	☐	☐	Max loading _____
H304 Rearing water temperature	☐	0	0	
H305 Number of ponds used in rearing	☐	0	0	Types?

Interview #_____

Parameters	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments for data
H300 Rearing Information - continued				
H306 Condition factor	☐	☐	0	Interval? _____
H307 Disease (inoculations/treatments)	☐	0	0	_____ Fish health monitoring program? _____
H308 Transfer history & methods	☐	0	0	_____
H309 Days reared	☐	0	0	_____
H310	0	0	0	_____
H311	☐	0	0	_____
H400 Release Information	☐	0	0	_____
H401 Total number released	☐	0	☐	_____
H402 Counting/estimation method (# released)	☐	0	0	_____
H403 Release location	☐	0	0	_____
H404 Release location coded	☐	☐	c l	Type of code necessary: _____
H405 Release Date(s)	0	0	☐	_____ First _____ Last _____
H406 Release information coded by brood year	☐	0	0	_____
H407 Release residualism data	0	☐	☐	_____
H408 Release purpose	☐	0	0	_____ Supplementation - Production -
H409 Physiological status at release (e.g. ATP-ase)	☐	0	0	_____
H410 Size at release	0	0	0	_____

Interview #_____

Paramolors	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/ Incomplete A=Adequate/ Available	Check for data you collect, maintain, or are contact person:	Commenrs lor data
H400 Release information - continued				
H411 Stage or class (e.g. fry, smolt, yearling)	☐	0	0	
H412 Type (e.g. production experimental, Index]	☐	☐	0	
H413 Release transition information	☐	cl	0	Volitional? Acclimated?
H414 Outmigration timing	☐	cl	☐	
H415 Riverine water conditions alter release	☐	☐	0	Temperature? Instream flows?
H416 Riverine habitat inventory	☐	0	cl	
H417 CWT marking data	☐	☐	0	
H418 PIT tagging data	☐	☐	0	
H419 Fin clip data	☐	☐	0	
H420 Chemical marking data	☐	☐	0	
H421 Natural missing adipose fin percentage	☐	☐	cl	
H422 Cot number (plant slip#, etc.)	-0	☐	☐	
H409	0	0	0	
H400	cl	0	0	
H500 Survival rates	0	0	0	
H501 Pre-spawning pre-halcherysurvival rate	☐	0	0	
H502 Pre-spawning a l halchery survival rate	☐	0	☐	

Interview #_____

Parameters	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments for data
H600 **Survival rates - continued**				
H603 Egg to fry survival rate	☐	0	0	_____
H604 Fry to smolt survival rate	☐	0	0	_____
H605 Smolt outmigration survival rate (to ocean)	☐	0	0	_____
H606 Smolt to adult survival rate..	☐	0	0	To sub-basin?_____ To rack?_____ Other?--
H607 Escapement to smolt survival rate	☐	0	0	_____
H699	☐	0	0	_____
H699	☐	0	0	_____
H600 What **Additional** Data Items do you Need?				
H699	☐	0	0	_____
H699	☐	☐	☐	_____
H699	cl	cl	cl	_____
H699	☐	0	0	_____
H699	☐	0	0	_____
H699	☐	0	0	_____
H699	☐	0	0	_____
H699	0	cl	0	_____
H699	☐	0	0	_____

Interview #_____

Name: _____

Natural Production

Natural Production Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain or are contact person: SSC PUC FAC CHH SOH CCH SUH CUH WSM TTD	Comments and Detail
N100 Escapement, Spawners, and Subbasin Harvest	0	0	☐☐☐☐☐☐☐☐	
N101 Spawner weir count..	0	☐	☐ ☐☐☐☐☐☐Ω	Years: 19 -
N102 Spawning escapement estimate.	☐	0	00000000	Years: 19 -
N103 Total redds in drainage....	☐	0	☐☐☐☐☐☐☐☐	Years: 19 -
N104 Redd count - index or trend	c l	0	☐☐☐☐☐☐☐☐	Years: 19 -
N105 Egg deposition estimate...	0	0	☐☐☐☐☐☐☐☐	Annual? _____ Average? _____
N106 Spawner age composition ...	0	0	00000000	Annual? ____ Average? ____ Scale? ____ Otoli lh? ____
N107 Spawner length frequency	0	0	00000000	Annual? _____ Average? _____
N108 Adult length-weight	0	0	☐☐☐☐☐☐☐☐	
N109 Spawner sex ratio	☐	0	00000000	Annual? - Average? _____
N110 Fecundity	0	0	☐☐☐☐☐☐☐☐	By Age? _____ Size? _____ Average? _____
N111 Spawner distribution in basin ..	0	0	☐☐☐☐☐☐☐☐	
N112 Spawning timing	☐	0	☐☐☐☐☐☐☐☐	
N113 Straying rate	0	'0	☐☐☐☐☐☐☐☐	
N114 Repeat Spawners (steelhead) ..	☐	0	☐☐	
N115 Hatchery spawners in wild ...	0	☐	☐ ☐Ω☐☐☐☐☐	
N116 Wild/natural sport harvest ..	☐	0	☐☐☐☐☐☐☐☐	
N117 Wild/natural tribal harvest ...	☐	0	☐☐☐☐☐☐☐☐	

Interview #_____

Natural Production Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain or are contact person: SPCH / SUCH / FACH / CHOH / SCCU / CHCT / SWST / DD	Comments and Detail
N100 Escapement, Spawners, and Subbasin Harvest - continued				
N190	cl	☐	☐☐☐☐☐☐☐☐	_____
N190	0	0	☐☐☐☐☐☐☐☐	_____
N200 Juveniles	☐	0	☐☐☐☐☐☐☐☐	_____
N201 Total parr abundance..	☐	0	☐☐☐☐☐☐☐☐	Season:_____
N202 Density - ages combined	☐	cl	☐☐☐☐☐☐☐☐	Season:_____
N203 Density - by age	0	cl	☐☐☐☐☐☐☐☐	Season:_____
N204 Length frequency	☐	0	☐☐☐☐☐☐☐☐	_____
N205 Length - weight..	0	0	☐☐☐☐☐☐☐☐	_____
N206 Condition coefficient	☐	cl	☐☐☐☐☐☐☐☐	_____
N207 Emergence timing	☐	0	☐☐☐☐☐☐☐☐	_____
N208 Distribution (time/area)	☐	0	☐☐☐☐☐☐☐☐	Summer?_____ Winter?_____ Other?_____
N209 Supplementation history	☐	0	0 0 0 0 0 0 0 0	_____
N299	cl	0	0 0 0 0 0 0 0 0	_____
N299	☐	0	0 0 0 0 0 0 0 0	_____
N300 Migrants/Smolts	0	0	o o b o o o o o	_____
N301 Smolt yield (total)	0	0	☐☐☐☐☐☐☐☐	Mark-recap.7_____ Tag/mark?_____
N302 Index or relative yield	0	0	0 0 0 0 0 0 0 0	_____

Interview #_____

Natural Production Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain or are contact person: SHCH / SPCH / FACH / CCCH / SOCH / CHCH / SUCH / WSCH	Comments and Detail
N300 Migrants/Smolts - continued				
N303 Smolt size distribution	0			
N304 Length - weight	0	0		
N305 Proportion smolting by age	0	0		By brood year?
N306 Residualism	0	0		
N307 Timing	0	0		PIT tag? ____ Mark? ____
N308 Travel time	0	0		PIT tag? ____ Mark? ____
N309	0			
N310	0			
N400 Survival, Recruitment, Production Studies	0	0		
N401 Prespawning survival		0		Index locations: ____
N402 Carrying capacity	0			Summer? ____ Winter? ____ Other: ____
N403 Egg to fry survival	0	0		
N404 Egg to parr survival	0	0		
N405 Egg to smolt survival	0	0		
N406 Parr to smolt survival	0	0		Pit tag? ____
N407 Inbasin smolt survival	0	0		Index locations: ____
N408 Mainstem smolt survival	0	0		Index locations: ____

Interview #_____

Natural Production Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain or are contact person: SSHC / SPHC / FUHC / ACHC / OCHC / SCHC / HUHC / SMHC / WSHC	Comments and Detail
N400 Survival, Recruitment, ... continued				
N409 Smolt to adult return	☐	0	☐☐☐☐☐☐☐☐	Index locations:
N410 Stock recruitment	0	0	0 0 0 0 0 0 0 0	Years:
N411 Production (tissue elaboration)	☐	0	☐☐☐☐☐☐☐☐	Growth rate? Standing Crop?
N412 Influence of cover	cl	0	☐☐☐☐☐☐☐☐	Life stage:
N413 Influence of sediment	☐	☐	☐☐☐☐☐☐☐☐	Life stage:
N414 Influence of LWD	0	0	☐☐☐☐☐☐☐☐	Life stage:
N415 Influence of channel unit type and composition	☐	0	☐☐☐☐☐☐☐☐	Life stage:
N416 Influence of habitat type	☐	☐	☐☐☐☐☐☐☐☐	Life stage:
N417 Influence of temperature	0	0	☐☐☐☐☐☐☐☐	Life stage:
N418 Effects of habitat improvement	☐	☐	☐☐☐☐☐☐☐☐	Riparian? Struct? Barrier? Off-Chan?
N419 Project costs	cl	cl	0 0 0 0 0 0 0 0	BPA? Other:
N499	0	cl	0 0 0 0 0 0 0 0	
N499	☐	☐	0 0 0 0 0 0 0 0	
N500 Genetics Characteristics	☐	0	0 0 0 0 0 0 0 0	
N501 Stock history	0	0	0 0 0 0 0 0 0 0	
N502 Hatchery stocks supplemented	☐	0	0 0 0 0 0 0 0 0	
N503 Hatchery strays	☐	0	0 0 0 0 0 0 0 0	CWT? Other:

Interview #_____

Natural Production Data Parameters	Data Needed: 1=Helpful 2=Important 0=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain or are contact person: SSPCH SUCCH FACHO CCOCK SHCMU SSHDT WSTD	Comments and Detail
N600 Genetics Characteristics - cont'd.				
N604 Electrophoretic profile	☐	☐	00000000	_____
N605 Meristics	0	0	00000000	List: _____
N606 Morphometrica	0	0	00000000	List: _____
N607 Pathologies and diseases	☐	☐	☐☐☐☐☐☐☐☐	_____
N608 Reproductive success of hatchery spawners in the wild	0	☐	00000000	_____
N609 Viability of hatchery offspring	0	☐	00000000	_____
N610	0	0	00000000	_____
N611	0	0	00000000	_____
N600 Fish and Wildlife Program Habitat	0	☐	00000000	_____
N601 Pre-project habitat condition	0	0	00000000	BPA format? ____ Other: _____
N602 Post-project habitat condition	0	0	00000000	BPA format? ____ Other: _____
N603 Predicted physical change	0	0	00000000	_____
N604 Actual physical change	0	0	00000000	_____
N605 Predicted fish production change	0	0	00000000	Juvenile? ____ Smolt? ____ Adult? _____
N606 Actual fish production change	☐	☐	00000000	Juvenile? ____ Smolt? ____ Adult? _____
N607 Predicted initial project costs	☐	0	00000000	BPA format? ____ Other: _____
N608 Actual initial project costs	☐	0	00000000	BPA format? - Other: _____

Interview #_____

Nalural Production Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain or are contact person: SCH / SPH / FCH / CHO / SOK / CMU / SHM / WSD	Comments and Detail
H600 Fish and Wildlife Program Habitat - continued				
H609 Predicted continuing costs	0	☐	☐	OfJIJOOfJO BPA format?-Other: _____
H610 Actual continuing Costa	☐	0	☐☐☐☐☐☐☐☐	BPA format?____Other: _____
H611 Discounted benefits : discounted cost	0	cl	☐☐☐☐☐☐☐☐	BPA format?____Other: _____
H600	☐	☐	0 0 0 0 0 0 0 0	_____
H600	☐	0	0 0 0 0 0 0 0 0	_____

Interview #_____

Habitat

Habitat Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N700 Drainage Basin Characteristics	0	0	0	_____
N701 Ecoregion	☐	0	0	E P A ? - Other: _____
N702 Geology	0	☐	0	Classes: _____
N703 Fire history	0	0	0	_____
N704 Landuse - qualitative	0	0	0	Classes: _____
N705 Landuse - quantitative	0	0	0	Area:_____ AUMs:_____ MMBF:_____ Tons:_____
N706 Landownership	0	cl	0	Classes: _____
N707 River protection	☐	0	0	Federal?___ State?___ NNPC?___ Other?_____
N708 Watershed management	cl	0	0	10yr plans?_____ Standards? _____
N709 Streamside management	0	cl	0	10yr plans?_____ Standards? _____
N710 Valley segment type	☐	0	0	Classes: _____
N711 Landtype	☐	0	0	Classes: _____
N712 Road construction	☐	0	0	Density?___ Age?___ Type?___ New?___
N713 Vegetation	0	0	0	_____
N714 Soils	☐	0	0	_____
N715 Climate	☐	0	cl	_____
N700	☐	cl	0	_____
N700	☐	0	0	_____

Interview #_____

Habitat Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N800 Stream Channel Characteristics	☐	0	0	_____
N801 Channel type	☐	0	0	Rosgen?_____ Other: _____
N802 Stream gradient	☐	0	☐	Topo map?_____ Field meas.?_____
N803 Stream order	☐	☐	0	_____
N804 Sinuosity	☐	0	0	_____
N805 Wetted width	☐	0	0	_____
N806 Bankfull channel	☐	0	0	Width?_____ Depth?_____
N807 Mean depth	☐	0	0	By channel unit?_____
N808 Maximum depth	☐	0	0	Thalweg?_____ By channel unit?_____
N809 Profile	☐	0	0	Long. bed7_____ Depth?_____
N810 Area/volume by channel unit types	0	0	0	Area7_____ Volume 7_____
N899	0	0	0	_____
N899	0	0	0	_____
N900 Barriers, Diversions, Screens	☐	0	0	_____
N901 Natural barriers, falls, etc.	0	0	0	_____
N902 Manmade barriers, culverts, etc.	cl	0	0	_____
N903 Water diversions, dewatering	☐	☐	☐	_____
N904 Screened/unscreened diversions	☐	0	0	_____

Interview #_____

Habitat Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N900 Diversions... continued				
N906 Intermittant barriers	cl	0	☐	Thermal?-Chem?_____Turb?_____Other_____
N909	0	0	0	
N909	0	0	☐	
N1000 Water Quantity	0	0	0	
N1001 Streamflow	☐	0	0	Season:
N1002 Stream stage,	☐	cl	cl	USGS?
N1002 Annual hydrograph	☐	0	0	
N1004 Instream water rights	0	0	0	
N1006 Diversion water rights	☐	☐	☐	
N1006 Gaged irrigation flow	☐	0	☐	
N1009	☐	0	0	
N1009	☐	0	0	
N1100 water Quality	-0	cl	0	
N1101 Temperature - Instantaneous	☐	☐	0	Season:
N1102 Temperature - max/min	0	0	0	Season: _____ Dally7 _____Weekly?_____
N1103 Temperalure - continuous	0	0	0	Season:
N1104 Turbidity	0	0	0	

Interview #_____

Habitat Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comment3 and Detail
N1100 Water Quality - continued				
N1105 Conductivity	0	0	0	
N1106 Dissolved oxygen	☐	0	0	
N1107 Total dissolved solids	☐	0	0	
N1108 Nutrients	0	0	0	List:
N1109 Metals	0	0	0	List:
N1110 Alkalinity/hardness	0	0	0	
N1111 pH	0	0	0	
N1199	0	0	0	
N1199	0	0	cl	
N1200 Invertebrates, General Biotic	0	0	0	
N1201 Macroinvertebrate abund.	☐	cl	☐	Rel. abund.?_____ S. Crop?_____ Drift?_____
N1203 Primary production	☐	0	0	Sp. Comp.?____ Prod. rate?____ Allochth.?_____
N1204 Nutrient uptake studies	☐	0	0	
N1205 Stand. crop particulate organic	☐	0	0	
N1999	0	0	0	
N1299	0	0	0	

Interview #_____

Habitat Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N1300 Substrate	☐	0	0	
N1301 Surface composition - visual	☐	0	cl	Classes:
N1302 Surface composition - measured	c l	0	0	Classes:
N1303 Embeddedness - visual	☐	0	0	
N1304 Embeddedness - measured	c l	0	0	
N1305 Surface fines - visual	0	0	0	
N1306 Surface fines - measured.	☐	☐	0	
N1307 Pebble counts.	☐	0	0	Wolman?_____ Other:
N1308 Core sample	☐	0	0	
N1309 Bedload	☐	0	0	
N1310 % Bedrock	cl	cl	0	
N1399	0	0	0	
N1399	☐	0	0	
N1400 Habitat Type and Cover.	0	0	0	
N1401 Habitat class or channel unit	0	0	0	Classes/units:
N1402 Area by habitat class/unit	0	0	0	
N1403 Volume by habitat class/unit	☐	0	0	
N1404 Pool:riffle ratio	cl	☐	0	

Interview #_____

Habitat Data Parameter3	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/ Incomplete A=Adequate/ Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N1400 Habitat Type and Cover - continued				
N1405 Pool quality.	0	0	0	
N1406 Pool frequency..	☐	0	☐	Pools/mi? ____ Primary pools/mi? - Other: -
N1407 Microhabitat formed by...	☐	0	0	
N1408 Microhabitat diversity	0	0	0	Class:
N1409 Amount or cover	0	0	0	
N1410 Type of cover	☐	0	0	Classes:
N1411 Cover complexity.	0	0	0	
N1412 Woody debris count	☐	☐	0	By size? ____ By channel unit? ____ By type? ____
N1413 Woody debris volume	0	0	0	By size? ____ By channel unit? ____ By type? -
N1414 Overhanging Vegetation	☐	☐	0	
N1415 Undercut banks	☐	☐	0	
N1416 Max. depth by channel unit	0	0	0	
N1499	☐	0	cl	
N1499	☐	0	☐	
N1500 Riparian and Streambanks	0	0	☐	
N1501 Condition of riparian zone	☐	0	0	% cover? ____ Density? ____ Basal area? -
N1502 Riparian vegetation type.	0	0	0	

Interview #_____

Habitat Data Parameters	Data Needed: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/Incomplete A=Adequate/Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N1600 Riparian and Stream Banks Continued				
N1603 Riparian veg. diversity	☐	☐	0	
N1604 Streambank stability	☐	0	0	
N1605 Amount or Shade	☐	0	0	
N1606 R4 U S F S Greenline	0	0	0	
N1607 woody species regeneration	☐	☐	0	R4?_____ Other:
N1608 Encroachments in riparian zone	☐	0	0	Roads? _____ Other:
N1609 Floodplain width	0	0	0	
N1610 Grazing utilization	cl	0	0	Riparian?_____ Upland?_____
N1611 Seral (successional) stage	☐	0	0	Clasaea:
N1612 woody debris recruitment potential	☐	☐	☐	Standing?_____ Downed?_____
N1613 Vegitation condition in floodplain	-0	cl	0	
N1614 Potential natural vegetation	0	0	0	Danbenmire?_____ Other:_____
N1615 In-channel LWD	-0	☐	0	Count?_____ Volume?_____
N1616 In-floodplain LWD	☐	0	☐	Count?_____ Volume?_____
N1699	☐	☐	0	
N1699	☐	0	0	

Interview #_____

Habitat Data Parameters	Data Needs: 1=Helpful 2=Important 3=Critical	Existing Data: M=Missing I=Inadequate/ incomplete A=Adequate/ Available	Check for data you collect, maintain, or are contact person:	Comments and Detail
N1600 Habitat Analysis and Summaries	☐	0	0	
N1601 Sediment yield models	☐	0	0	
N1602 R1R4 FISHSED	☐	0	cl	
N1603 Limiting factors analyala,	☐	0	0	
N1604 Channel dynamica	0	0	0	
N1605 Channel geometry	cl	0	0	
N1606 Channel stability	cl	☐	0	
N1607 IFIM minimum streamflow	☐	0	0	
N1608 EPA rapid bioaaaessment	☐	0	0	
N1609 Biotic condition Index	☐	0	0	
N1610 Residual pool depth	0	☐	☐	
N1611 Riparian rate of recovery	☐	0	0	
N1612 Remote sensing/aerial photos.	0	0	0	
N1613 GIS applicallona	0	0	0	
N1614 Channel unit distribution	☐	0	0	Summe_____ Winter?_____ Flowstage?_____
N1615 Channel network riparian analysis	☐	0	0	
N1616 Cumulalive effects analyala	☐	0	0	
N1699	☐	0	0	

Interview #_____
Name: _____

Coordinated Information System
Concluding Questions

A. What are your top three unmet Information needs?

_____
_____
_____
_____
_____
_____
_____
_____
_____

B. What frustrates you the most about present Information sharing In the Columbia Basin?

_____
_____
_____
_____
_____
_____
_____
_____

Interview #_____

Concluding Questions

C. We have Identifled three types of potential CIS users: policy, system technlcal, and sub-basln technlcal. From your perspective,

1. What Informatlon would you most want to receive from these groups?

Policy: _____

_____

_____

_____

_____

Sys tern Technlcal: _____

_____

_____

_____

_____

Sub-basln Technlcal: _____

_____

_____

_____

_____

Interview #_____

Concluding Questions

2. What information is most important for these groups to understand about your activities?

Policy: _____

_____

_____

_____

_____

Sys tern Technical: _____

_____

_____

_____

_____

Sub-basin Technical: _____

_____

_____

_____

_____

Interview #_____

Name: _____

Supplemental Comments

Subject Code	Comments

Interview #_____

Name: _____

Supplemental Comments

Subject Code	Comments

APPENDIX B - SYSTEM RESULTS

Regional Perspective
Policy Perspective
System Perspective
Subbasin Perspective

APPENDIX TABLE B1 - CIS SURVEY SYSTEM RESULTS
(H)elpful (I)mportant (C)ritical (N)umber of responses
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 122	NEEDS				AVAILABILITY				COLL?
	N	H	I	C	N	A	I	M	YES
S100 ● .'FISH a WILD PROG EFFECT DATA"									
S101 Water budget	54	14	12	28	43	19	23	1	5
S102 Screens (FGE)	40	7	12	21	30	9	19	2	5
S103 Transportation	45	8	15	22	35	11	23	1	4
S104 Upstream passage improvement	48	3 2 2 2 3			39	7	31	1	1
S105 Habitat improvement	54	11	26	17	45	11	33	1	8
S106 Program hatchery production	49	8	24	17	45	27	17	I	9
S107 Hatchery effectiveness	53	4	19	30	46	7	38	1	9
S108 Supplementation	53	2	24	27	47	833		6	8
S109 Genetic risks	SO	8	18	24	46	4	32	10	1
S110 Contribution to doubling goal	48	17	lb	15	43	9	28	6	1
S111 Program costs	36	lb	9	11	33	14	16	3	5
S200 ***ESCAPEMENT and SPAWNERS"'									
S201 Columbia R. mouth	47	8	16	23	4 3 2 0 2 0			3	4
S202 Bonneville Dam	51	6	lb	29	45	n	16	2	4
S203 To upper dam	59	6	17	36	so	35	15	0	8
S204 By major tributary	66	8 2 5 3 3			56	10	39	7	14
S205 By indicator stream	54	8	18	28	48	9	31	8	12
S300 "'ADULT DAM LOSS/CONVERSION***									
S301 Bonneville to McNary	67	9	lb	22	43	7	34	2	0
S302 McNary to Ice Harbor	40	7	13	20	36	6	28	2	2
S303 Ice Harbor to Lower Granite	40	8	14	18	36	5	30	1	1
S304 McNary to Priest Rapids	38	10	13	15	34	6	27	1	2
S305 Priest Rapids to mid-Col dams	34	11	11	12	32	6	25	1	1
S400 ***OCEAN HARVEST-'									
S401 Catch	49	11	12	26	40	lb	23	1	4
S402 Harvest rate	so	11	14	25	41	10	30	1	2
S403 Allocation by fishery	42	9	16	17	36	11	25	0	3
S404 Stock-specific	39	6	13	m	33	7	22	4	2
S405 Economics/social	39	19	17	3	36	11	m	5	0
S500 ***INRIVER HARVEST***									
S501 Catch - Zones 1-6	58	10	-12	36	48	26	22	0	7
S502 Harvest rate - Zones 1-6	59	10	13	36	49	19	30	0	6
S503 Allocation by fishery	45	10	15	m	37	17	m	0	4
S504 Stock-specific	45	4	6	35	37	6	27	4	4
S505 Economics/social	31	14	15	2	26	8	15	3	1
S600* **SUBBASIN HARVEST***									
S601 Catch	52	7	19	26	44	18	24	2	7
S602 Harvest rate	53	11	17	25	45	15	28	2	7
S603 Allocation by fishery	43	12	12	19	37	lb	20	1	6
sb04 Stock-specific	35	5	10	m	30	10	18	2	5
S605 Economics/social	35	16	14	5	27	3	21	3	1
S700 ***PRESMOLT PRODUCTION"'									
S701 Carrying capacity	60	11	23	26	50	4	40	6	7
S702 Egg to smolt survival	57	12	21	24	48	4	38	6	6
S703 Potential carrying capacity	58	9	29	m	48	3	40	5	7
S704 Production levels by subbasin	58	10	28	m	46	5	37	4	5
S705 Production levels - indicator or other stocks	40	8	18	14	34	5	25	4	4
S800 ***SMOLT PRODUCTION"'									
S801 Carrying capacity	63	8	25	30	55	5	43	7	5
S802 Egg to smolt survival	57	9	25	23	48	3	40	5	4
S803 Potential carrying capacity	61	9	24	28	53	5	40	8	5
S804 Production levels by subbasin	60	8	28	2-r	51	5	41	5	2
S805 Production levels - indicator or other stocks	47	8	20	19	42	9	30	3	6
S806 Hatchery releases	58	6	18	34	48	37	11	0	16
S900 ***SMOLT PASSAGE and SURVIVAL"*									
S901 Reservoir survival	54	9	15	30	43	2	39	2	1
SW2 Smolts arriving at dams	52	9	20	23	43	13	30	0	3
S903 Number transported	so	12	20	18	42	30	12	0	1
S904 Transport benefit ratio	46	10	15	21	38	6	3 0	2	0
S905 Fish guidance efficiency	49	10	lb	23	40	7	32	1	1
S906 Bypass survival	49	8	12	29	41	5	35	1	2
S907 Turbine survival	48	7	13	28	41	8	31	2	2
S908 Predation rates	50	10	12	28	44	4	36	4	2
S909 Total smolt survival	56	6	12	38	46	1	43	2	2
S910 Arrival timing - aggregate stocks	51	10	20	21	41	15	26	0	3
S911 Arrival timing - indicator stocks	50	10	16	24	40	15	25	0	4
S912 Flow/velocity effects	53	8	13	32	42	0	41	1	3
S913 Spill effects	50	8	18	24	41	5	36	0	2
S914 Gas supersaturation effects	50	13	22	15	41	16	23	2	3

APPENDIX TABLE B2 - CIS SURVEY SYSTEM RESULTS
(H)elpful (I)mportant (C)ritical (N)umber of responses
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 26	NEEDS				AVAILABILITY				COLL?
	N	H	I	C	N	A	I	M	YES
S100 "'FISH & WILD PROG EFFECT DATA"'									
S101 Water bi[illegible]	12	3	I	8	11	5	6	0	0
S102 Screens (FGE)	II'	2	2	7	8	2	6	0	0
S103 Transportation	11	2	3	6	8	4	4	0	0
S104 Upstream passage improvement	11	0	4	7	9	1	8	0	0
S105 Habitat improvement	13	3	5	5	10	4	6	0	1
S106 Program hatchery production	11	4	4	3	11	7	4	0	1
S107 Hatchery effectiveness	10	3	3	4	10	2	8	0	2
S108 Supplementation	12	2	4	6	11	4	5	2	1
S109 Genetic risks	10	3	4	3	10	2	5	3	0
S110 Contribution IO doubling goal	10	1	6	3	10	3	4	3	1
S111 Program costs	8	2	4	2	7	4	1	2	0
S200 ***ESCAPEMENT and SPAWNERS"'									
S201 Columbia R. mouth	9	2	6	1	8	5	3	0	1
S202 Bonneville Dam	10	2	5	3	9	8	1	0	I
S203 To upper dam	11	1	5	5	10	9	1	0	1
S204 By major tributary	12	1	8	3	9	2	6	1	1
S205 By indicator stream	9	2	5	2	8	3	4	1	1
S300 "*ADULT DAM LOSS/CONVERSION***									
S301 Bonneville to McNary	9	1	3	5	9	2	7	0	0
S302 McNary to Ice Harbor	9	2	2	5	9	2	7	0	0
S303 Ice Harbor to Lower Granite	9	1	2	6	9	2	7	0	0
S304 McNary to Priest Rapids	8	3	2	3	8	2	6	0	0
S305 Priest Rapids to mid-Col dams	8	4	2	2	8	3	5	0	0
S400 "'OCEAN HARVEST***									
S401 Catch	7	2	2	3	7	3	3	1	1
S402 Harvest rate	8	3	2	3	8	3	4	1	0
S403 Allocation by fishery	5	2	1	2.	5	2	3	0	1
S404 Stock-specific	3	0	0	3	3	1	2	0	0
S405 Economics/social	5	2	3	0	5	2	2	1	0
S500 ***INRIVER HARVEST***		1	0	0		1	0	0	0
S501 Catch-Zones 1-6	8	4	1	3	8	5	3	0	1
S502 Harvest rate - Zones 1-6	8	4	1	3	8	3	5	0	1
S503 Allocation by fishery	7	3	2	2	6	3	3	0	0
S504 Stock-specific	4	0	1	3	4	1	3	0	0
S505 Economics/social	4	1	3	0	4	2	2	0	0
S600 *'SUBBASIN HARVEST***									
S601 Catch	7	3	2	2	7	4	3	0	1
S602 Harvest rate	8	4	1	3	8	3	5	0	0
S603 Allocation by fishery	5	2	1	2	5	3	2	0	0
S604 Stock-specific	4	0	1	3	5	1	4	0	0
S605 Economics/social	5	1	4	0	4	1	3	0	0
S700 "'PRESMOLT PRODUCTION***									
S701 Carrying capacity	11	1	5	5	9	0	6	3	0
S702 Egg to parr survival	11	1	5	5	9	0	6	3	0
S703 Potential carrying capacity	11	2	5	4	9	0	8	1	0
S704 Production levels by subbasin	13	3	6	4	10	1	8	1	1
S705 Production levels - indicator or other stocks	10	2	5	3	8	1	6	1	1
S800 ***SMOLT PRODUCTION***									
S801 Carrying capacity	12	1	5	6	10	1	7	2	0
S802 Egg to smolt survival	12	1	5	6	10	0	7	3	0
S803 Potential carrying capacity	12	1	6	5	10	2	7	1	0
S804 Production levels by subbasin	14	2	6	6	11	2	8	I -	0
S805 Production levels - indicator or other stocks	9	I	4	4	8	3	4	1	2
S806 Hatchery releases	10	1	3	6	9	6	3	0	1
S900 ***SMOLT PASSAGE and SURVIVAL***									
S901 Reservoir survival	12	0	4	8	10	1	8	1	0
S902 Smolts arriving at dams	12	0	5	7	10	4	6	0	0
S903 Number transported	12	2	4	6	10	7	3	0	0
S904 Transport benefit ratio	11	1	4	6	9	I	7	1	0
S905 Fish guidance efficiency	11	0	3	8	9	0	9	0	0
S906 Bypass survival	11	1	1	9	9	1	8	0	0
S907 Turbine survival	11	1	2	8	9	2	6	1	0
S908 Predation rates	12	2	2	8	10	1	8	1	0
S909 Total smolt survival	12	0	2	10	10	0	10	0	0
S910 Arrival liming - aggregate stocks	12	1	4	7	9	4	5	0	0
S911 Arrival timing - indicator stocks	12	2	3	7	10	4	6	0	0
S912 Flow/velocity effects	12	0	3	9	10	0	10	0	0
S913 Spill effects	11	0	5	6	9	1	8	0	0
SY 14 Gas supersaturation effect.5	11	1	4	6	8	4	4	0	1

APPENDIX TABLE B3 - CIS SURVEY SYSTEM RESULTS
(H)elpful (I)mportant (C)ritical (N)umber of responses
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 56	NEEDS				AVAILABILITY				COLL?
	N	Ii	I	c	N	A	I	M	YES
S100 ***FISH & WILD PROG EFFECT DATA"'									
S101 Water budget	30	7	8	IS	22	10	12	0	a
S102 Screens (FGE)	22	4	7	11	17	7	9	1	4
S103 Transportation	21	2	7	12	17	5	12	0	2
S104 Upstream passage improvement	26	1	13	12	22	4	18	0	1
S105 Habitat improvement	2s	4	17	7	24	5	19	0	6
S106 Program hatchery production	23	1	14	8	20	14	6	0	4
S107 Hatchery effectiveness	28	1	12	15	23	4	19	0	4
S108 Supplementation	27	0	14	13	24	3	19	2	5
S109 Genetic risks	27	4	11	12	24	1	17	6	1
S110 Contribution lo doubling goal	26	11	7	8	23	4	16	3	0
S111 Program costs	19	11	3	5	19	9	9	1	4
S200 ***ESCAPEMENT and SPAWNERS"'									
S201 Columbia R. mouth	25	4	5	16	22	11	8	3	2
S202 Bonneville Dam	25	2	4	19	22	14	6	2	1
S203 To upper dam	32	3	8	21	28	20	8	0	5
S20.1 By major tributary	38	5	12	21	33	6	22	5	9
S205 By indicator stream	32	3	10	19	29	5	19	S	6
S300 ***ADULT DAM LOSS/CONVERSION***									
S301 Bonneville to McNary	28	4	10	14	25	3	20	2	0
S302 McNary to Ice Harbor	24	1	10	13	21	3	16	2	2
S303 Ice Harbor IO Lower Granite	25	3	10	12	22	2	19	1	1
S304 McNary to Priest Rapids	21	2	9	10	19	2	16	1	2
S305 Priest Rapids to mid-Col dams	19	2	8	9	18	1	16	1	1
S400 '*'OCEAN HARVEST"'									
S401 Catch	30	6	8	16	23	11	12	0	1
S402 Harvest rate	30	5	9	16	23	6	17	0	1
S403 Allocation by fishery	2s	4	11	10	21	8	13	0	1
S404 Stock-specific	25	2	10	13	22	5	13	4	2
S405 Economics/social	22	9	11	2	21	7	12	2	0
SSOO ***INRIVER HARVEST"									
S501 Catch - Zones 1-6	34	3	9	2 2	28	15	13	0	5
S502 Harvest rate - Zones 1 4	35	3	9	23	29	11	18	0	4
S503 Allocation by fishery	26	5	11	lo	22	12	10	0	3
S504 Stock-specific	30	2	2	26	25	3	19	3	3
S505 Economics/social	17	6	9	2	15	4	9	2	1
S600 "'SUBBASIN HARVEST"									
S601 Catch	30	3	13	14	26	11	14	1	6
S602 Harvest rate	30	5	12	13	26	10	15	1	7
S603 Allocation by fishery	26	8	8	10	23	10	12	1	6
S604 Stock-specific	23	3	8	12	21	7	13	1	5
S605 Economics/social	19	9	7	3	17	1	14	2	1
S700 ***PRESMOLT PRODUCTION"'									
S701 Carrying capacity	32	8	11	13	26	2	22	2	3
S702 Egg to part survival	31	9	12	10	26	2	23	1	3
S703 Potential carrying capacity	30	6	16	8	24	2	22	0	4
S704 Production levels by subbasin	29	5	is	9	23	2	18	3	3
S705 Production levels - indicator or other stocks	20	3	10	7	17	2	12	3	2
S800 "'SMOLT PRODUCTION"'									
S801 Carrying capacity	35	6	12	17	30	2	24	4	2
S802 Egg to smolt survival	29	7	12	10	23	2	20	1	2
S803 Potential carrying capacity	33	7	11	15	28	2	23	3	3
S804 Production levels by subbasin	31	5	13	13	26	1	21	4	1
S805 Production levels - indicator or other stocks	27	4	12	11	23	4	17	2	2
S806 Hatchery releases	34	3	13	18	27	21	6	0	9
S900 ***SMOLT PASSAGE and SURVIVAL"'									
S901 Reservoir survival	28	5	6	17	23	1	21	1	1
S902 Smolts arriving at dams	27	5	11	11	24	8	16	0	3
S903 Number transported	27	6	12	9	22	16	6	0	1
S904 Transport benefit ratio	24	4	8	12	19	2	16	1	0
S905 Fish guidance efficiency	26	5	10	11	21	4	16	1	1
S906 Bypass survival	27	4	9	14	24	3	20	1	2
SQ07 Turbine survival	26	3	9	14	24	5	18	1	2
SQOS Predation rates	27	5	9	13	25	2	20	3	2
S909 Total smolt survival	29	2	7	20	2s	1	22	2	2
S910 Arrival timing-aggregate stocks	27	5	II	11	24	9	15	0	3
S911 Arrival timing - indicator stocks	26	5	9	12	22	9	13	0	4
S912 Flow/velocity effects	29	5	7	17	23	0	22	1	3
S913 Spill effects	27	4	9	14	23	4	19	0	2
s914 Gas supersaturation effects	27	6	14	7	23	10	11	2	2

APPENDIX TABLE B4 - CIS SURVEY SYSTEM RESULTS
(H)elpful (I)mportant (C)ritical (N)umber of responses
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 40	NEEDS				AVAILAI3ILII-Y				COLL?
	N	H	I	c	N	A	I	M	YES
S100 "'FISH A WILD PROG EFFECT DATA***									
S101 Water budget	12	4	3	5	10	4	5	1	1
S102 Screens (FGE)	7	1	3	3	5	0	4	1	1
S103 Transportation	13	4	5	4	10	2	7	1	2
5104 Upstream passage improvement	11	2	5	4	8	2	5	1	0
S105 Habitat improvement	13	4	4	5	11	2	8	1	1
S106 Program hatchery production	15	3	6	6	14	6	7	1	4
S107 Hatchery effectiveness	15	0	4	11	13	1	11	1	3
S108 Supplementation	14	0	6	8	12	1	9	2	2
S109 Genetic risks	13	1	3	9	12	1	10	1	0
S110 Contribution to doubling goal	12'	5	3	4	10	2	8	0	0
Slll Program costs	9	3	2	4	7	1	6	0	1
S200 ***ESCAPEMENT and SPAWNERS***									
S201 Columbia R. mouth	13	2	5	6	13	4	9	0	1
S202 Bonneville Dam	16	2	7	7	14	5	9	0	2
S203 To upper dam	16	2	4	10	12	6	6	0	2
S204 By major tributary	16	2	5	9	14	2	11	1	4
S205 By indicator stream	13	3	3	7	11	1	8	2	5
S300 "'ADULT DAM LOSS/CONVERSION"'									
S301 Bonneville to McNary	10	4	3	3	9	2	7	0	0
S302 McNaryto Ice Harbor	7	4	1	2	6	1	5	0	0
S303 Ice Hat-bar to Lower Granite	6	4	2	0	5	1	4	0	0
S304 McNary to Priest Rapids	9	5	2	2	7	2	5	0	0
S305 Priest Rapids to mid-Col dams	7	5	1	1	6	2	4	0	0
S400 '*'OCEAN HARVEST***									
S401 Catch	12	3	2	7	10	2	8	0	2
S402 Harvest rate	12	3	3	6	10	1	9	0	1
S403 Allocation by fishery	12	3	4	5	10	1	9	0	1
S404 Stock-specific	11	4	3	4	8	1	7	0	0
S405 Economics/social	12	8	3	1	10	2	6	2	0
SSOO *** INRIVER HARVEST'*									
S501 Catch-Zones 1-6	16	3	2	11	12	6	6	0	1
S502 Harvest rate - Zones 1-6	16	3	3	10	12	5	7	0	1
S503 Allocation by fishery	12	2	2	8	9	2	7	0	1
S504 Stock-specific	11	2	3	6	8	2	5	1	1
S505 Economics/social	10	7	3	0	7	2	4	1	0
S600 ***SUBBASIN HARVEST***									
S601 Catch	15	1	4	10	11	3	7	1	0
S602 Harvest rate	15	2	4	9	11	2	8	1	0
S603 Allocation by fishery	12	2	3	7	9	3	6	0	0
S604 Stock-specific	8	2	1	5	4	2	1	1	0
S605 Economics/social	11	6	3	2	6	1	4	1	0
S700 ***PRESMOLT PRODUCTION***									
S701 Carrying capacity	17	2	7	8	15	2	'12	1	4
S702 Egg to parr survival	15	2	4	9	13	2	9	2	3
S703 Potential carrying capacity	17	1	8	8	15	1	10	4	3
S704 Production levels by subbasin	16	2	7	7	13	2	11	0	1
S705 Production levels - indicator or ocher stocks	10	3	3	4	9	2	7	0	1
S800 "'SMOLT PRODUCTION***									
S801 Carrying capacity	16	1	8	7	15	2	12	1	3
S802 Egg to smolt survival	16	1	8	7	15	1	13	1	2
S803 Potential carrying capacity	16	1	7	8	15	1	10	4	2
S804 Production levels by subbasin	IS	1	9	5	14	2	12	0 '	1
S805 Production levels - indicator or other stocks	11	3	4	4	11	2	9	0	2
S806 Hatchery releases	14	2	2	10	12	10	2	0	6
S900 ***SMOLT PASSAGE and SURVIVAL"'									
S90 1 Reservoir survival	14	4	5	5	10	0	10	0	0
S902 Smolts arriving at dams	13	4	4	5	9	1	8	0	0
S903 Number transported	11	4	4	3	M	7	3	0	0
S904 Transport benefit ratio	11	5	3	3	10	3	7	0	0
S905 Fish guidance efficiency	12	5	3	4	10	3	7	0	0
S906 Bypass survival	11	3	2	6	8	1	7	0	0
S907 Turbine survival	11	3	2	6	8	1	7	0	0
S908 Predation rates	11	3	1	7	9	1	8	0	0
S909 Totalsmolt survival	IS	4	3	8	11	0	11	0	0
S910 Arrival liming-aggregate stocks	12	a	5	3	8	2	6	0	0
S911 Arrival timing - indicator stocks	12	3	4	5	8	2	6	0	0
S912 Flow/velocity effects	12	3	3	6	9	0	9	0	0
S913 Spill effects	12	4	4	4	9	0	9	0	0

APPENDIX C - NATURAL PRODUCTION RESULTS

Natural Production Results

Habitat Results

Appendix C2

IDAHO, OREGON, AND WASHINGTON
POLICY VIEW

US SURVEY
NATURAL PRODUCTION RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned

	NEEDS			AVAILABILITY		COU		COLL	COLL	COLL	COLL	COLL	COLL	COLL	
	H	N I	c	A	A I	SP CHIN MY	SU CHIN Y	F CHIN Y	COHO Y	SOCK Y	CHUM Y	SSTHD Y	WSTHD Y		
N100 *** ESCAPE, SPAWN, AND SUBBASIN HARVEST ***	2	4	3	3	3	1	3	0	1	2	0	0	3	2	GAP
N101 SPAWNER WEIR COUNT	2	4	3	4	3	1	1	0	0	1	0	0	1	1	0.89
N102 SPAWNING ESCAPEMENT ESTIMATE	0	6	7	3	8	0	3	0	1	2	0	0	2	1	1.12
N103 TOTAL REDDS IN DRAINAGE	3	5	4	2	5	2	1	0	0	0	0	0	1	0	1.04
N104 REDD COUNT- INDEX OR TREND	1	7	4	4	4	1	2	0	0	0	0	0	1	0	a96
N105 EGG DEPOSITION ESTIMATE	4	3	3	3	3	2	1	0	0	0	0	0	1	0	0.89
N106 SPAWNER AGE COMPOSITION	2	3	4	2	3	2	1	0	0	0	0	0	1	0	1.11
N107 SPAWNER LENGTH FREQUENCY	4	3	1	1	5	0	1	0	0	0	0	0	1	0	0.75
N108 ADULT LENGTH-WEIGHT	5	2	1	1	5	0	1	0	0	0	0	0	1	0	0.69
N109 SPAWNER SEX RATIO	3	3	3	2	5	0	1	0	0	0	0	0	1	0	0.88
N110 FECUNDITY	2	4	3	3	4	0	1	0	0	0	0	0	1	0	0.87
N111 SPAWNER DISTRIBUTION IN BASIN	1	5	s	1	7	0	1	0	0	1	0	0	1	0	1.11
N112 SPAWNING TIMING	3	4	5	6	3	0	1	0	0	0	0	0	1	0	0.81
N113 STRAYING RATE	3	4	3	1	6	1	0	0	0	0	0	0	1	0	1.00
N114 REPEAT SPAWNERS (STEELHEAD)	4	2	0	1	3	0	0	0	0	0	0	0	1	0	0.59
N115 HATCHERY SPAWNERS IN WILD	2	5	4	0	8	1	2	0	1	1	0	0	2	1	1.16
N116 WILD/NATURAL SPORT HARVEST	2	5	4	4	3	2	1	0	1	1	0	0	2	1	0.98
N117 WILD/NATURAL TRIBAL HARVEST	3	4	4	4	3	1	2	0	1	1	0	0	2	1	0.88
N200 *** JUVENILES ---	0	1	1	0	2	0	0	0	0	0	0	0	0	0	1.25
N201 TOTAL PARR ABUNDANCE	4	3	2	2	5	2	1	0	0	0	0	0	1	0	0.89
N202 DENSITY - AGES COMBINED	5	2	2	2	4	2	1	0	0	0	0	0	1	0	a s
N203 DENSITY - BY AGE	3	2	2	2	3	1	1	0	0	0	0	0	1	0	0.86
N204 LENGTH FREQUENCY	3	2	2	2	4	0	1	0	0	0	0	0	1	0	0.80
N205 LENGTH - WEIGHT	.	1	2	2	4	0	1	0	0	0	0	0	1	0	a73
N206 CONDITION COEFFICIENT	4	2	1	2	2	2	1	0	0	0	0	0	1	0	a79
N207 EMERGENCE TIMING	2	3	5	2	5	1	1	0	0	0	0	0	1	0	1.08
N208 DISTRIBUTION (TIME/AREA)	2	3	4	2	5	0	1	0	0	0	0	0	1	0	a97
N209 SUPPLEMENTATION HISTORY	4	1	4	3	4	0	1	0	1	1	0	0	1	1	0.82
N300 --- MIGRANTS/SMOLTS ---	0	2	1	1	2	0	1	0	0	0	0	0	1	0	
N301 SMOLT YIELD (TOTAL)	3	3	4	3	4	1	2	0	0	1	0	0	2	1	a93
N302 INDEX OR RELATIVE YIELD	2	2	4	2	3	0	1	0	0	0	0	0	1	0	a94
N303 SMOLT SIZE DISTRIBUTION	5	2	2	5	3	0	2	0	0	1	0	0	1	1	0.63
N304 LENGTH - WEIGHT	5	2	1	4	1	2	1	0	0	0	0	0	1	0	0.66
N305 PROPORTION SMOLTING BY AGE	4	3	1	3	2	2	1	0	0	0	0	0	1	0	0.76
N306 RESIDUALISM	4	2	2	2	4	1	2	0	0	1	0	0	2	1	0.82
N307 TIMING	4	3	5	5	5	0	1	0	0	0	0	0	1	0	0.83
N308 TRAVEL TIME	4	3	5	4	5	1	1	0	0	0	0	0	1	0	a91
N400 *** SURVIVAL, RECRUITMENT, PRODUCTION STU	0	1	1	0	2	0	1	0	1	1	0	0	1	1	
N401 PRESPAWNING SURVIVAL	0	3	7	0	5	2	0	0	0	0	0	0	0	0	1.58
N402 CARRYING CAPACITY	0	4	7	0	8	0	1	0	1	1	0	0	1	1	1.32
N403 EGG TO FRY SURVIVAL	1	2	7	0	5	2	0	0	0	0	0	0	0	0	1.52
NW EGG TO PARR SURVIVAL	1	2	7	0	5	2	0	0	0	0	0	0	0	0	1.52
N405 EGG TO SMOLT SURVIVAL	1	2	7	0	6	1	0	0	0	0	0	0	0	0	1.40
N406 PARR TO SMOLT SURVIVAL	1	2	7	0	5	2	0	0	0	0	0	0	0	0	1.52
N407 INBASIN SMOLT SURVIVAL	2	1	7	0	6	1	0	0	0	0	0	0	0	0	1.35
N408 MAINSTEM SMOLT SURVIVAL	0	2	8	1	7	0	0	0	0	0	0	0	0	0	1.32
N409 SMOLTTO ADULT RETURN	1	5	6	1	10	0	2	0	1	2	0	0	2	2	1.16
N410 STOCK RECRUITMENT	2	3	5	0	7	1	1	0	1	1	0	0	1	1	1.23
N411 PRODUCTION (TISSUE ELABORATION)	4	1	1	0	4	1	0	0	0	0	0	0	0	0	a83
N412 INFLUENCE OF COVER	3	2	2	1	5	0	0	0	0	0	0	0	0	0	0.86
N413 INFLUENCE OF SEDIMENT	3	2	3	1	5	0	0	0	0	0	0	0	0	0	0.92
N414 INFLUENCE OF LWD	2	2	3	1	5	0	0	0	0	0	0	0	0	0	0.99
N415 INFL OF CHANNEL UNIT TYPE AND COMPOSITION	2	3	2	1	5	0	0	0	0	0	0	0	0	0	0.92
N416 INFLUENCE OF HABITAT TYPE	2	2	3	1	5	0	0	0	0	0	0	0	0	0	0.99
N417 INFLUENCE OF TEMPERATURE	1	3	3	0	6	0	0	0	0	0	0	0	0	0	1.14
N418 EFFECTS OF HABITAT IMPROVEMENT	0	5	3	0	3	4	2	1	1	1	0	0	2	1	1.66
N419 PROJECT COSTS	2	2	2	1	0	3	1	1	1	1	0	0	1	1	1.33
N500 --- GENETICS CHARACTERISTICS ---	1	1	1	0	2	1	0	0	0	0	0	0	0	0	
N501 STOCK HISTORY	3	6	2	3	5	1	2	1	1	1	0	0	2	1	0.86
N502 HATCHERY STOCKS SUPPLEMENTED	1	2	3	2	2	1	1	1	1	1	0	0	1	1	1.06
NS03 HATCHERY STRAYS	2	3	3	1	3	3	2	1	1	1	0	0	2	1	1.24
N504 ELECTROPHORETIC PROFILE	2	1	3	0	5	0	0	0	0	0	0	0	0	0	1.08
N505 MERISTICS	3	2	0	1	3	1	0	0	0	0	0	0	0	0	0.70
N506 MORPHOMETRICS	3	2	0	1	3	1	0	0	0	0	0	0	0	0	0.70
N507 PARASITES AND DISEASES	3	3	0	2	3	0	0	0	0	0	0	0	0	0	0.63
N508 EFFECTIVENESS OF HAT SPAWN IN WILD	1	2	5	0	6	2	0	0	0	0	0	0	0	0	1.43
N509 VIABILITY OF HATCHERY OFFSPRING	1	2	4	0	5	2	0	0	0	0	0	0	0	0	1.42
N600 --- FISH AND WILDLIFE PROGRAM HABITAT ---	1	1	7	0	3	2	2	2	2	2	2	2	2	2	
N601 PRE-PROJECT HABITAT CONDITION	3	4	4	2	3	1	0	0	0	0	0	0	0	0	097
N602 POST-PROJECT HABITAT CONDITION	3	3	5	2	3	1	0	0	0	0	0	0	0	0	1.01
N603 PREDICTED PHYSICAL CHANGE	3	4	4	2	3	1	0	0	0	0	0	0	0	0	0.97
N604 ACTUAL PHYSICAL CHANGE	2	4	4	2	2	1	0	0	0	0	0	0	0	0	1.00
N605 PREDICTED FISH PRODUCTION CHANGE	1	4	6	1	4	1	0	0	0	0	0	0	0	0	1.23
N606 ACTUAL FISH PRODUCTION CHANGE	2	3	7	1	4	3	0	0	0	0	0	0	0	0	1 38
N607 PREDICTED INITIAL PROJECT COSTS	5	2	2	3	1	1	0	0	0	0	0	0	0	0	069
N608 ACTUAL INITIAL PROJECT COSTS	5	2	2	3	1	1	0	0	0	0	0	0	0	0	0 69
N609 PREDICTED CONTINUING COSTS	4	2	2	2	2	1	0	0	0	0	0	u	0	0	0.80
N610 ACTUAL CONTINUING COSTS	4	2	2	2	2	1	0	0	0	0	0	0	0	0	0 80
N611 DISCOUNTED BENEFITS, DISCOUNTED COST	3	2	2	2	2	1	0	0	0	0	0	0	0	0	0 84

IDAHO, OREGON, AND WASHINGTON
SYSTEM TECHNICAL VIEW

as SURVEY
NATURAL PRODUCTION RESULTS
(H)elpful (I)mportant (C)ritical
A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned

	NEEDS			AVAILABILITY			COLL.	COLL.	COLL.	COLL.	COLL.	COLL.	COLL.	COLL.	
	H	N I	c	A	A I		SP CHIN MY	SU CHIN Y	F CHIN Y	COHO Y	SOCK Y	CHUM Y	SSTHD Y	WSTHD Y	
N 100 --- ESCAPE SPAWN, AND SUBBAS HARVEST ***	1	5	15	2	15	1	4	3	3	1	3	1	5	4	GAP
N101 SPAWNER WEIR COUNT	3	5	13	5	13	0	6	.	2	1	1	1	7	4	1.09
N102 SPAWNING ESCAPEMENT ESTIMATE	2	5	25	5	20	0	10	8	6	4	4	2	10	6	1.24
N103 TOTAL REDDS IN DRAINAGE	5	8	14	S	16	0	8	6	3	2	1	2	6	6	1.04
N104 REDD COUNT - INDEX OR TREND	6	8	17	8	17	0	11	9	4	3	3	3	9	6	1.02
N105 EGG DEPOSITION ESTIMATE	7	6	5	0	14	2	4	3	0	0	0	0	3	3	1.01
N106 SPAWNER AGE COMPOSITION	4	10	10	4	16	0	7	6	2	1	2	1	7	4	1.02
N107 SPAWNER LENGTH FREQUENCY	9	8	6	4	15	0	6	5	1	0	0	0	5	3	0.8
N108 ADULT LENGTH-WEIGHT	8	5	3	1	12	1	2	2	0	0	0	0	3	3	0.84
N109 SPAWNER SEX RATIO	5	10	7	3	15	0	5	4	2	1	0	0	8	4	a97
N110 FECUNDITY	4	8	7	1	16	0	3	3	1	1	0	0	7	4	L05
Nlll SPAWNER DISTRIBUTION IN BASIN	4	8	11	4	15	0	5	4	2	2	0	1	6	5	1.04
N112 SPAWNING TIMING	5	11	10	7	14	0	5	4	4	2	2	2	6	.	0.94
N113 STRAYING RATE	4	10	11	2	17	2	3	2	2	1	0	1	2	2	1.14
N114 REPEAT SPAWNERS (STEELHEAD)	10	6	0	4	10	0	0	0	0	0	0	0	1	1	0.60
N115 HATCHERY SPAWNERS IN WILD	4	8	15	2	20	0	3	2	2	1	0	1	5	3	1.15
N116 WILD/NATURAL SPORT HARVEST	2	9	16	7	17	0	5	2	2	1	1	1	6	3	1.10
N117 WILD/NATURAL TRIBAL HARVEST	1	6	15	6	15	1	3	2	1	0	1	0	3	1	1.16
N200 *** [illegible]	1	3	7	0	11	0	1	1	0	0	0	0	2	2	1.27
N201 TOTAL PARR ABUNDANCE	0	9	10	2	14	0	3	1	0	0	0	0	4	2	1.19
N202 DENSITY - AGES COMBINED	3	10	4	2	14	0	3	2	0	1	0	0	5	2	a97
N203 DENSITY - BY AGE	3	9	3	1	13	0	7.	2	0	1	0	0	6	3	a97
N204 LENGTH FREQUENCY	4	9	1	3	11	0	4	2	1	1	1	1	3	1	0.81
N205 LENGTH - WEIGHT	2	11	1	3	11	0	4	2	1	1	1	1	3	1	as7
N206 CONDITION COEFFICIENT	4	9	2	2	12	0	3	2	1	1	0	0	3	1	us7
N207 EMERGENCE TIMING	4	7	6	1	14	0	0	0	0	0	0	0	1	1	LO?
N208 DISTRIBUTION (TIME/AREA)	3	9	11	3	17	1	3	1	0	1	0	0	5	2	1.12
N209 SUPPLEMENTATION HISTORY	4	5	10	5	13	0	1	1	0	0	0	0	1	0	1.02
N300 *** MIGRANTS/SMOLTS ***	1	4	5	0	10	0	2	2	1	1	1	0	3	2	
N301 SMOLT YIELD (TOTAL)	2	8	13	2	15	1	2	1	1	1	0	0	2	2	1.21
N302 INDEX OR RELATIVE YIELD	4	7	5	0	14	1	1	0	0	0	0	0	1	1	1.07
N303 SMOLTSIZE DISTRIBUTION	5	9	2	2	10	0	2	1	0	1	0	0	2	1	0.61
N304 LENGTH - WEIGHT	3	7	3	4	9	0	3	2	2	1	1	1	3	1	0.87
N305 PROPORTION SMOLTING BY AGE	7	6	7	0	17	0	2	1	0	1	0	0	2	1	1.00
N306 RESIDUALISM	3	8	7	0	15	0	3	1	1	2	0	0	3	1	1.11
N307 TIMING	2	8	12	1	15	1	4	3	3	2	2	1	5	3	1.23
N308 TRAVEL TIME	4	7	13	0	17	1	4	3	3	1	2	1	4	2	1.22
N400 *** SURVIVAL, RECRUITMENT, PRODUCTION STU	1	4	6	0	11	1	3	2	0	0	0	0	1	1	
N401 PRESPAWNWG SURVIVAL	3	4	10	0	13	2	3	2	1	1	0	0	3	3	1.29
N402 CARRYING CAPACITY	3	4	14	0	18	1	4	2	2	2	1	1	3	3	1.30
N1403 EGG m FRY SURVIVAL	3	8	6	0	15	0	1	0	0	0	0	0	1	1	1.09
N404 EGG TO PARR SURVIVAL	3	5	9	1	14	0	3	1	0	0	0	0	1	1	1.14
N405 EGG m SMOLT SURVIVAL	3	6	11	0	17	0	3	2	1	1	0	0	2	2	1.20
N406 PARR TO SMOLT SURVIVAL	3	7	10	0	17	0	2	1	0	0	0	0	1	1	1.16
N407 INBASIN SMOLT SURVIVAL	1	10	13	0	19	2	3	2	1	1	0	0	2	2	1.31
N408 MAINSTEM SUOLTSURVIVAL	1	7	15	0	20	1	2	1	1	1	0	0	2	2	1.34
N409 SMOLT TO ADULT RETURN	2	5	20	0	21	0	3	1	0	0	0	0	2	2	1.33
N410 STOCK RECRUITMENT	2	2	16	0	20	0	2	1	0	0	1	0	1	1	1.35
N411 PRODUCTION (TISSUE ELABORATION)	6	3	1	0	9	1	1	0	0	0	0	0	0	0	a79
N412 INFLUENCE OF COVER	6	6	4	1	14	0	1	0	0	0	0	0	1	1	0.91
N413 INFLUENCE OF SEDIMENT	4	5	7	1	14	0	2	0	0	0	0	0	2	1	1.06
N414 INFLUENCEOF LWD	6	5	5	3	12	0	1	0	0	0	0	0	1	1	0.55
N415 INFL OF CHANNEL UNIT TYPE AND COMPOSITION	5	7	4	2	13	0	2	0	0	0	0	0	2	1	0.91
N416 INFLUENCE OF HABITAT TYPE	4	8	5	1	15	0	2	0	0	0	0	0	2	1	1.00
N417 INFLUENCE OF TEMPERATURE	3	10	6	2	14	0	2	0	0	0	0	0	3	1	1.02
N418 EFFECTS OF HABITAT IMPROVEMENT	2	8	9	1	17	0	2	0	0	0	0	0	4	2	1.15
N419 PROJECT COSTS	6	4	2	4	8	0	1	0	0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	u71
N500 - GENETICS CHARACTERISTICS -	1	6	8	0	14	1	2	2	1	1	1	0	3	J	
N501 STOCK HISTORY	3	7	10	6	13	0	3	2	0	0	0	0	4	1	1.01
N502 HATCHERY STOCKS SUPPLEMENTED	3	6	11	9	10	0	4	3	0	1	0	1	4	1	0.97
N503 HATCHERY STRAYS	5	4	11	0	18	0	3	2	0	0	0	0	2	1	1.15
N504 ELECTROPHORETIC PROFILE	3	9	7	2	17	0	4	3	1	1	2	1	3	2	1.05
N505 MERISTICS	6	3	5	0	12	0	1	0	0	0	0	0	0	0	0.96
N506 MORPHOMETRICS	5	5	5	0	13	0	1	0	0	0	0	0	2	0	1.00
N507 PARASITES AND DISEASES	2	5	6	1	9	1	3	2	0	0	1	0	1	0	1.15
N508 EFFECTIVENESS OF HAT SPAWN IN WILD	2	9	10	0	17	2	3	2	0	0	0	0	2	1	1.26
N509 VIABILITY OF HATCHERY OFFSPRING	3	8	10	0	17	2	3	2	0	0	0	0	2	1	1.9
N600 *** FISH AND WILDLIFE PROGRAM HABITAT"	4	6	3	0	13	0	3	2	1	1	2	1	2	2	
N601 PRE-PROJECT HABITAT CONDITION	1	10	5	1	12	1	2	1	1	1	0	0	3	2	1.13
N602 POST-PROJECT HABITAT CONDITION	1	10	5	2	11	1	2	1	1	1	0	0	3	2	1.09
N603 PREDICTED PHYSICALCHANGE	5	9	3	1	14	0	2	1	1	1	0	0	3	2	0.91
N604 ACTUAL PHYSICAL CHANGE	3	10	5	1	14	1	2	1	1	1	0	0	2	2	1.06
N605 PREDICTED NH PRODUCTION CHANGE	2	11	5	2	14	0	2	1	1	1	0	0	3	2	1.02
N606 ACTUAL FISH PRODUCTION CHANGE	0	9	9	1	14	1	2	1	1	1	0	0	3	2	1.25
N607 PREDICTED INITIAL PROJECT COSTS	5	5	2	5	7	0	1	1	1	1	0	0	1	1	a72
N608 ACTUAL INITIAL PROJECT COSTS	5	4	3	4	8	0	1	1	1	1	0	0	1	1	OW
N609 PREDICTED CONTINUING COSTS	4	4	1	5	5	0	1	0	0	0	0	0	0	0	0.67
N610 ACTUAL CONTINUING COSTS	2	5	2	5	5	0	1	0	0	0	0	0	0	0	0.50
N611 DISCOUNTED BENEFITS. DISCOUNTED COST	4	4	2	3	8	0	1	0	0	0	0	0	0	0	o w

Appendix C4

IDAHO, OREGON, AND WASHINGTON
SUBBASIN TECHNICAL VIEW

CIS SURVEY
NATURAL PRODUCTION RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned

	NEEDS			AVAILABILITY			COU	COLL	COLL	COLL	COLL	COLL	COU	COLL	
	N			A			SP CHIN	SU CHIN	F CHIN	COHO	SOCK	CHUM	SSTHD	WSTHD	
	H	I	C	A	I		MY	Y	Y	Y	Y	Y	Y	Y	
N100 *** ESCAPE SPAWN. AND SUBBAS HARVEST***	1	5	12	5	12	0	5	3	3	1	1	0	5	2	GAP
N101 SPAWNER WEIR COUNT	1	11	9	4	11	2	7	3	4	3	1	0	5	2	1.12
N102 SPAWNING ESCAPEMENT ESTIMATE	1	9	16	4	18	0	5	3	4	2	1	0	6	4	1 IS
N103 TOTAL REDDS IN DRAINAGE	3	13	11	6	13	3	3	2	2	0	0	0	2	1	107
N104 REDD COUNT - INDEX OR TREND	2	14	12	5	17	1	6	3	3	1	0	0	6	3	1.W
N105 EGG DEPOSITION ESTIMATE	5	7	6	1	10	5	3	1	1	a	0	0	2	0	1.17
N106 SPAWNER AGE COMPOSITION	3	12	5	2	12	2	4	2	4	2	1	0	3	3	1 05
N107 SPAWNER LENGTH FREQUENCY	7	10	2	3	11	1	5	2	2	1	0	0	5	3	0 S1
N108 ADULT LENGTH-WEIGHT	9	6	1	0	12	2	2	1	2	0	0	0	1	0	0.S1
N109 SPAWNER SEX RATIO	6	14	2	2	14	1	6	5	4	1	1	0	4	3	0 SS
N110 FECUNDITY	3	10	8	2	14	2	3	2	3	1	1	0	3	0	1.12
NIII SPAWNER DISTRIBUTION IN BASIN	2	13	9	2	17	1	5	4	3	3	1	1	5	3	1.12
N112 SPAWNING TIMING	2	16	10	7	17	0	3	3	3	2	0	1	2	3	1.00
N113 STRAYING RATE	3	7	9	0	15	2	4	2	2	2	0	1	4	3	1.3
N114 REPEAT SPAWNERS (STEELHEAD)	6	7	3	0	10	-4	0	0	0	0	0	0	2	2	1 06
N115 HATCHERY SPAWNERS IN WILD	2	11	13	0	14	6	4	2	3	3	1	1	5	3	IA?
N116 WILD/NATURAL SPORT HARVEST	0	9	11	5	9	1	3	1	2	3	1	1	4	4	1.13
N117 WILD/NATURAL TRIBAL HARVEST	1	7	8	2	7	2	2	1	2	1	1	0	2	0	1.22
N200 --- JUVENILES ***	1	4	5	2	5	1	2	1	1	1	1	0	2	0	1.13
N201 TOTAL PARR ABUNDANCE	2	7	12	0	14	3	8	4	3	3	1	1	8	2	1.36
N202 DENSITY - AGES COMBINED	3	8	10	2	11	4	9	5	3	3	1	1	9	2	1'4
N203 DENSITY - BY AGE	2	11	10	2	12	4	9	5	3	3	1	1	10	2	1.24
N204 LENGTH FREQUENCY	2	13	3	2	13	1	6	4	3	3	1	1	8	2	1.00
N205 LENGTH -WEIGHT	4	8	3	0	9	3	4	2	2	1	1	0	4	1	1.10
N206 CONDITION COEFFICIENT	7	5	3	0	9	3	2	2	2	1	1	0	2	0	0.99
N207 EMERGENCE TIMING	3	15	8	2	16	4	4	2	2	2	1	0	3	1	1.15
N208 DISTRIBUTION (TIME/AREA)	3	10	8	0	16	2	8	4	3	2	1	1	8	1	1.1s
N209 SUPPLEMENTATION HISTORY	2	9	9	4	13	0	6	3	3	4	1	1	6	3	1.05
N300 - --MIGRANTS/SMOLTS ***	0	2	6	0	8	0	1	1	1	1	1	0	1	0	
N301 SMOLT YIELD (TOTAL)	1	8	15	0	16	5	6	3	2	2	1	0	5	1	1.47
N302 INDEX OR RELATIVE YIELD	1	6	8	0	6	6	0	0	0	0	0	0	0	0	1.64
N303 SMOLT SIZE DISTRIBUTION	3	9	5	1	13	2	4	2	2	2	1	0	3	1	1.09
N304 LENGTH - WEIGHT	5	9	3	0	13	2	4	2	2	2	1	0	3	1	1.01
N305 PROPORTION SMOLTING BY AGE	2	10	6	0	11	4	3	2	2	1	1	0	2	0	1.28
N306 RESIDUALISM	2	12	8	0	11	6	4	3	2	1	1	0	4	0	1.38
N307 TIMING	1	11	13	3	15	2	6	3	2	2	1	0	5	1	1.21
N308 TRAVEL TIME	4	9	12	1	15	3	4	2	2	1	1	0	3	0	1.22
N400 *** SURVIVAL, RECRUITMENT, PRODUCTION STU	0	6	7	1	9	1	1	1	1	1	1	0	1	0	
N401 PRESPAWNING SURVNAL	4	6	7	0	12	3	3	1	1	1	1	0	3	0	1.21
N402 CARRYING CAPACITY	1	13	9	1	17	3	6	3	3	2	1	1	5	1	1.23
N403 EGG TO FRY SURVIVAL	1	11	9	0	14	5	4	2	- 2	1	1	0	3	1	1.37
N404 EGG m PARR SURVIVAL	0	10	10	0	13	4	6	3	2	1	1	0	4	0	1.42
N405 EGG m SMOLT SURVIVAL	0	8	12	0	13	4	4	2	2	1	1	0	3	0	1.47
N406 PARR TO SMOLT SURVIVAL	0	8	10	0	11	4	4	2	2	1	1	0	3	0	1.47
N407 INBASIN SMOLT SURVIVAL	1	11	8	0	12	4	4	2	2	1	1	0	3	0	1.34
N408 MAINSTEM SMOLT SURVIVAL	0	10	9	0	9	4	3	1	1	1	1	0	3	0	146
N409 SMOLT TO ADULT RETURN	3	10	12	3	15	0	5	2	2	2	1	1	4	2	1.09
N410 STOCK RECRUITMENT	1	8	7	1	11	0	3	2	2	2	1	0	1	1	1.14
N411 PRODUCTION (TISSUE ELABORATION)	3	3	3	0	5	1	1	1	1	1	1	0	1	0	1.09
N412 INFLUENCE OF COVER	3	17	4	2	16	1	5	2	2	1	1	0	4	0	0.99
N413 INFLUENCE OF SEDIMENT	3	13	10	3	16	1	8	3	2	1	1	0	7	0	1.08
N414 INFLUENCE OF LWD	4	12	5	2	14	1	5	2	2	1	1	0	4	0	0.99
N415 INFL OF CHANNEL UNIT TYPE AND COMPOSITION	4	13	6	2	15	1	7	3	2	1	1	0	6	0	1.02
N416 INFLUENCE OF HABITAT TYPE	2	15	7	2	16	1	7	2	2	1	1	0	5	0	1.08
N417 INFLUENCE OF TEMPERATURE	5	12	8	3	17	1	6	2	2	2	1	0	4	1	1.01
N418 EFFECTS OF HABITAT IMPROVEMENT	5	14	7	1	19	1	9	3	2	2	1	0	6	1	1.04
N419 PROJECT COSTS	7	4	3	1	11	0	4	2		1	1	0	4	1	0.62
N500 *** GENETICS CHARACTERISTICS ***	1	2	9	0	9	0	1	1	1	1	1	0	2	1	
N501 STOCK HISTORY	1	7	15	3	16	2	6	3	,	2	1	0	5	3	1.27
N502 HATCHERY STOCKS SUPPLEMENTED	2	6	13	3	15	1	5	3	2	1	1	0	6	2	1.20
N503 HATCHERY STRAYS	2	6	12	0	14	4	5	3	2	,	1	0	6	2	1.41
N504 ELECTROPHORETIC PROFILE	4	4	9	0	11	3	3	2	1	1		0	4	1	1.28
N505 MERISTICS	4	5	3	0	7	3	1	1	1	1	1	0	1	0	1.13
N506 MORPHOMETRICS	.	5	3	0	7	3	1	1	1	1	1	0	1	0	1.13
N507 PARASITES AND DISEASES	2	8	6	0	11	2	3	2	2	1	1	0	2	0	1.22
N508 EFFECTIVENESS OF HAT SPAWN IS WILD	1	7	16	0	14	6	6	3	2	2	1	0	6	2	1.54
N509 VIABILITY OF HATCHERY OFFSPRING	1	5	15	0	9	7	5	3	2	2	1	0	5	2	1.71
N600 *** FISH AND WILDLIFE PROGRAM HABITAT ***	3	4	7	2	8	1	2	2	1	1	1	0	2	1	
N601 PRE-PROJECT HABITAT CONDITION	4	12	6	3	1s	1	7	5		1	1	0	5	1	0.99
N602 POST-PROJECT HABITAT CONDITION	3	13	7	4	14	1	9	4		1	1	0	6	2	1.01
N603 PREDICTED PHYSICAL CHANGE	3	13	6	2	15	1	6	3	2	1	1	0	4	1	1.04
N604 ACTUAL PHYSICAL CHANGE	3	12	7	3	14	1	8	4	2	1	1	0	6	1	1.03
N605 PREDICTED FISH PRODUCTION CHANGE	4	10	8	1	14	2	6	4	2	1	1	0	4	1	I I?
N606 ACTUAL FISH PRODUCTION CHANGE	3	7	13	1	14	3	6	3		1	1	0	5	0	1.29
N607 PREDICTED INITIAL PROJECT COSTS	9	3	5	1	11	1	3	2	2	1	1	0	2	0	0 SS
N608 ACTUAL INITIAL PROJECT COSTS	8	4	5	2	10	1	3	2		1	1	0	2	0	0 SS
N609 PREDICTED CONTINUING COSTS	7	5	2	1	9	2	4	3		1	1	0		1	0 86
N610 ACTUAL CONTINUING COSTS	7	6	2	1	10	2	4	3		1	1	0	2	1	0.87
N611 DISCOUNTED BENEFITS, DISCOUNTED COST	7	4	1	1	8	2	4	3	2	1	1	0	,	1	0.79

REGIONAL

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 125

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I	M	Y	
N700 • ** DRAINAGE BASIN CHARACTERISTICS • **	10	21	12	10	22	2	6	GAP
N701 ECOREGION	10	24	8	17	17	0	2	0.78
N702 GEOLOGY	12	23	7	21	13	0	2	0.72
N703 FIRE HISTORY	18	14	4	13	17	0	2	0.66
N704 LANDUSE - QUALITATIVE	6	29	14	17	20	1	6	0.89
N705 LANDUSE - QUANTITATIVE	7	24	20	13	26	1	6	0.98
N706 LANDOWNERSHIP	17	19	6	23	11	0	5	0.65
N707 RIVER PROTECTION	9	23	18	17	20	1	8	0.90
N708 WATERSHED MANAGEMENT	4	26	25	8	33	2	3	1.11
N709 STREAMSIDE MANAGEMENT	2	28	25	8	31	2	9	1.13
N710 VALLEY SEGMENT TYPE	13	21	7	8	22	2	3	0.85
N711 LANDTYPE	15	20	5	13	15	3	2	0.75
N712 ROAD CONSTRUCTION	10	22	13	16	18	1	5	0.85
N713 VEGETATION	8	28	10	11	22	1	3	0.89
N714 SOILS	9	30	5	16	16	0	2	0.76
N715 CLIMATE	14	24	4	19	12	0	1	0.67
N800 • ** STREAM CHANNEL CHARACTERISTICS • **	7	27	11	5	28	1	11	
N801 CHANNEL TYPE	10	25	14	16	22	1	15	0.87
N802 STREAM GRADIENT	9	34	9	18	25	0	19	0.83
N803 STREAM ORDER	13	28	5	22	16	0	11	0.71
N804 SINUOSITY	13	25	6	10	24	2	10	0.83
N805 WETTED WIDTH	8	28	10	11	26	2	13	0.92
N806 BANKFULL CHANNEL	9	26	7	11	22	2	10	0.86
N807 MEAN DEPTH	12	26	9	10	27	1	17	0.87
N808 MAXIMUM DEPTH	9	26	7	7	28	1	11	0.90
N809 PROFILE	12	24	5	8	25	2	11	0.84
N810 AREA/VOLUME BY CHANNEL UNIT TYPES	9	26	6	6	25	3	12	0.92
N900 • ** BARRIERS, DIVERSIONS, SCREENS • **	6	17	13	9	22	1	7	
N901 NATURAL BARRIERS, FALLS, ETC.	7	2.5	19	20	25	0	17	0.91
N902 MANMADE BARRIERS, CULVERTS, ETC.	5	24	24	16	30	0	17	1.00
N903 WATER DIVERSIONS, DEWATERING	4	18	31	15	30	1	11	1.09
N904 SCREENED/UNSCREENED DIVERSIONS	4	21	28	15	31	1	13	1.07
N905 INTERMITTANT BARRIERS	9	23	9	8	29	0	10	0.90
N1000 • ** WATER QUANTITY • **	4	12	21	6	22	1	2	
N1001 STREAMFLOW	4	22	30	19	26	0	13	1.02
N1002 STREAM STAGE	7	13	15	12	17	0	4	0.92
N1003 ANNUAL HYDROGRAPH	10	15	16	15	18	1	4	0.89
N1004 INSTREAM WATER RIGHTS	5	15	24	16	19	2	6	1.02
N1005 DIVERSION WATER RIGHTS	5	13	25	14	21	1	3	1.04
N1006 GAGED IRRIGATION FLOW	8	10	20	5	23	2	0	1.10
N1100 *** WATER QUALITY ***	4	10	18	3	22	1	3	
N1101 TEMPERATURE - INSTANTANEOUS	14	21	19	15	25	2	20	0.91
N1102 TEMPERATURE - MAX/MIN	11	22	25	6	37	2	16	1.07
N1103 TEMPERATURE - CONTINUOUS	9	19	23	6	27	4	9	1.11
N1104 TURBIDITY	19	21	13	7	30	2	9	0.89
N1105 CONDUCTIVITY	12	23	7	9	23	3	13	0.87
N1106 DISSOLVED OXYGEN	18	17	14	10	28	3	14	0.88
N1107 TOTAL DISSOLVED SOLIDS	17	16	7	6	24	3	8	0.84
N1108 NUTRIENTS	16	16	11	4	25	5	7	0.96
N1109 METALS	15	16	9	5	22	4	6	0.91
N1110 ALKALINITY/HARDNESS	14	16	9	5	24	3	9	0.91
N1111 PH	15	17	8	7	23	3	11	0.86
N1200 • ** INVERTEBRATES, GENERAL BIOTIC • **	12	16	3	0	23	2	4	
N1201 MACROINVERTEBRATE ABUND	17	22	5	4	24	7	8	0.90
N1202 PRIMARY PRODUCTION	16	15	4	2	16	9	1	0.95
N1203 NUTRIENT UPTAKE STUDIES	16	11	2	2	12	11	0	0.93
N1204 STAND. CROP PARTICULATE ORGANIC	12	14	2	2	14	8	1	0.94
N1300 • ** SUBSTRATE • **	10	15	9	1	21	4	6	
N1301 SURFACE COMPOSITION - VISUAL	11	22	10	7	24	2	14	0.92

Appendix C5 Cont.

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I	M	Y	GAP
N1302 SURFACE COMPOSITION - MEASURED	14	19	5	4	23	4	6	0.88
N1303 EMBEDDEDNESS - VISUAL	13	21	5	5	20	3	9	0.87
N1304 EMBEDDEDNESS - MEASURED	13	16	13	4	24	4	5	1.00
N1305 SURFACE FINES - VISUAL	11	21	8	7	19	3	11	0.90
N1306 SURFACE FINES - MEASURED	10	17	9	2	21	4	3	1.02
N1307 PEBBLE COUNTS	9	13	5	2	17	3	3	0.95
N1308 CORE SAMPLE	14	14	4	2	17	6	2	0.92
N1309 BEADLOAD	12	12	8	2	19	3	2	0.96
N1310 % BEDROCK	13	12	7	4	19	2	7	0.87
N1400 . ** HABITAT TYPE AND COVER . **	7	16	15	2	25	3	9	
N1401 HABITAT CLASS OR CHANNEL UNIT	8	21	13	9	23	1	13	0.94
N1402 AREA BY HABITAT CLASS/UNIT	8	22	12	9	23	2	12	0.95
N1403 VOLUME BY HABITAT CLASS/UNIT	10	17	8	5	22	2	7	0.92
N1404 POOL:RIFFLE RATIO	4	27	13	9	24	2	13	1.00
N1405 POOL QUALITY	8	21	14	8	26	2	11	0.99
N1406 POOL FREQUENCY	8	18	14	8	23	2	10	0.99
N1407 MICROHABITAT FORMED BY	8	15	7	4	18	2	5	0.94
N1408 MICROHABITAT DIVERSITY	8	15	8	4	19	2	5	0.96
N1409 AMOUNT OF COVER	5	28	14	8	26	2	12	1.01
N1410 TYPE OF COVER	10	23	9	5	24	2	10	0.94
N1411 COVER COMPLEXITY	10	19	8	4	22	3	7	0.96
N1412 WOODY DEBRIS COUNT	9	19	13	5	22	5	7	1.05
N1413 WOODY DEBRIS VOLUME	10	20	7	3	20	6	5	1.01
N1414 OVERHANGING VEGETATION	5	25	11	9	19	3	12	0.98
N1415 UNDERCUT BANKS	8	23	11	9	21	3	12	0.95
N1416 MAX. DEPTH BY CHANNEL UNIT	8	18	7	5	17	4	6	0.97
N1500 . ** RIPARIAN AND STREAMBANKS . **	4	17	15	3	23	3	6	
N1501 CONDITION OF RIPARIAN ZONE	3	19	26	8	27	3	12	1.16
N1502 RIPARIAN VEGETATION TYPE	7	22	14	8	24	3	10	1.01
N1503 RIPARIAN VEG. DIVERSITY	10	21	11	9	21	3	10	0.93
N1504 STREAMBANK STABILITY	4	26	20	6	30	3	12	1.12
N1505 AMOUNT OF SHADE	6	26	13	4	27	3	10	1.06
N1506 R4 USFS GREENLINE	7	13	3	3	15	2	5	0.89
N1507 WOODY SPECIES REGENERATION	5	19	10	5	17	5	6	1.07
N1508 ENCROACHMENTS IN RIPARIAN ZONE	5	19	14	5	23	3	5	1.08
N1509 FLOODPLAIN WIDTH	11	16	6	5	18	3	4	0.89
N1510 GRAZING UTILIZATION	4	21	18	6	26	3	9	1.12
N1511 SERAL (SUCCESSIONAL) STAGE	7	19	5	8	15	3	5	0.88
N1512 WOODY DEBRIS RECRUITMENT POTENTIAL	5	19	12	5	20	4	4	1.08
N1513 VEGETATION CONDITION IN FLOODPLAIN	7	21	8	7	18	4	6	0.96
N1514 POTENTIAL NATURAL VEGETATION	7	18	10	7	15	5	2	1.01
N1515 IN-CHANNEL LWD	7	15	16	5	22	4	7	1.10
N1516 IN-FLOODPLAIN LWD	8	20	7	3	20	5	4	1.02
N1600 *** HABITAT ANALYSIS AND SUMMARIES . **	5	19	6	2	22	2	3	
N1601 SEDIMENT YIELD MODELS	12	18	7	5	24	2	3	0.89
N1602 R1R4 FISHSED	8	9	5	4	14	3	3	0.91
N1603 LIMITING FACTORS ANALYSIS	7	19	15	3	24	9	4	1.20
N1604 CHANNEL DYNAMICS	10	17	4	3	18	5	1	0.94
N1605 CHANNEL GEOMETRY	12	14	3	2	17	5	0	0.90
N1606 CHANNEL STABILITY	11	21	4	3	23	4	4	0.92
N1607 IFIMMINIMUM STREAM FLOW	10	23	9	3	26	6	5	1.03
N1608 EPA RAPID BIOASSESSMENT	14	10	3	2	13	9	4	0.93
N1609 BIOTIC CONDITION INDEX	16	11	2	2	16	6	4	0.83
N1610 RESIDUAL POOL DEPTH	11	14	4	2	19	5	2	0.93
N1611 RIPARIAN RATE OF RECOVERY	11	16	8	4	21	4	3	0.96
N1612 REMOTE SENSING/AERIAL PHOTOS	14	14	4	6	19	1	3	0.77
N1613 GIS APPLICATIONS	13	17	9	4	24	4	5	0.95
N1614 CHANNEL UNIT DISTRIBUTION	10	11	2	3	13	4	3	0.85
N1615 CHANNEL NETWORK RIPARIAN ANALYSIS	9	13	5	2	15	4	1	0.97
N1616 CUMULATIVE EFFECTS ANALYSIS	5	15	20	1	26	9	4	1.34

POLICY VIEW

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 24

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I		MY	
N700 .**DRAINAGE BASIN CHARACTERISTICS .**	0	6	2	1	1	2	0	GAP
N701 ECOREGION	3	5	2	5	2	0	1	0.70
N702 GEOLOGY	3	5	2	5	2	0	1	0.70
N703 FIRE HISTORY	3	3	2	5	1	0	0	0.66
N704 LANDUSE - QUALITATIVE	2	4	6	5	2	1	0	0.93
N705 LANDUSE - QUANTITATIVE	2	4	5	4	2	1	1	0.94
N706 LANDOWNERSHIP	2	3	3	6	0	0	0	0.71
N707 RIVER PROTECTION	1	4	5	3	3	0	0	0.96
N708 WATERSHED MANAGEMENT	0	6	7	2	6	1	1	1.20
N709 STREAMSIDE MANAGEMENT	1	6	5	2	5	1	2	1.10
N710 VALLEY SEGMENT TYPE	4	4	2	4	1	1	0	0.72
N711 LANDTYPE	4	5	2	4	1	1	0	0.73
N712 ROAD CONSTRUCTION	2	3	5	5	1	1	1	0.89
N713 VEGETATION	1	5	5	3	3	1	0	1.03
N714 SOILS	2	6	3	5	1	0	0	0.74
N715 CLIMATE	3	5	2	6	0	0	0	0.63
N800***STREAM CHANNEL CHARACTERISTICS .**	1	6	3	1	3	1	2	
N801 CHANNEL TYPE	3	3	3	3	3	0	1	0.80
N802 STREAM GRADIENT	3	5	1	3	3	0	2	0.71
N803 STREAM ORDER	3	4	1	3	3	0	2	0.70
N804 SINUOSITY	3	2	3	3	2	1	1	0.86
N805 WETTED WIDTH	3	3	2	3	2	1	1	0.80
N806 BANKFULL CHANNEL	3	4	1	3	2	1	1	0.75
N807 MEAN DEPTH	3	4	2	3	3	0	2	0.76
N808 MAXIMUM DEPTH	3	3	3	3	3	0	1	0.80
N809 PROFILE	3	4	2	3	3	0	0	0.76
N810 AREA/VOLUME BY CHANNEL UNIT TYPES	3	5	1	3	3	0	1	0.71
N900 .**BARRIERS, DIVERSIONS, SCREENS .**	1	4	4	3	2	1	2	
N901 NATURAL BARRIERS, FALLS, ETC.	2	3	6	4	5	0	2	0.97
N902 MANMADE BARRIERS, CULVERTS, ETC.	2	2	8	5	4	0	2	0.98
N903 WATER DIVERSIONS, DEWATERING	2	1	9	5	3	1	2	1.06
N904 SCREENED/UNSCREENED DIVERSIONS	2	0	10	4	4	1	3	1.14
N905 INTERMITTANT BARRIERS	1	4	3	2	5	0	2	0.98
N1000***WATER QUANTITY .**	0	2	6	2	0	1	0	
N1001 STREAMFLOW	1	5	8	6	5	0	2	0.98
N1002 STREAM STAGE	1	2	7	6	2	0	0	0.95
N1003 ANNUAL HYDROGRAPH	2	2	5	5	1	1	0	0.91
N1004 INSTREAM WATER RIGHTS	1	1	8	2	5	1	0	1.27
N1005 DIVERSION WATER RIGHTS	1	1	8	2	5	1	0	1.27
N1006 GAGED IRRIGATION FLOW	2	2	7	2	5	1	0	1.16
N1100***WATER QUALITY .**	0	2	6	1	2	1	0	
N1101 TEMPERATURE - INSTANTANEOUS	2	5	6	4	5	0	2	0.94
N1102 TEMPERATURE - MAX/MIN	1	4	7	1	7	0	1	1.18
N1103 TEMPERATURE - CONTINUOUS	1	3	6	2	3	1	0	1.15
N1104 TURBIDITY	3	5	4	3	5	0	1	0.88
N1105 CONDUCTIVITY	2	4	2	2	3	0	1	0.83
N1106 DISSOLVED OXYGEN	2	4	4	3	3	0	1	0.88
N1107 TOTAL DISSOLVED SOLIDS	3	2	3	3	2	0	0	0.77
N1108 NUTRIENTS	1	4	3	2	3	0	0	0.94
N1109 METALS	3	2	3	3	2	0	0	0.77
N1110 ALKALINITY/HARDNESS	3	2	3	3	2	0	1	0.77
N1111 PH	3	2	3	3	2	0	1	0.77
N1200 .**INVERTEBRATES, GENERAL BIOTIC ***	1	3	1	0	3	0	0	
N1201 MACROINVERTEBRATE ABUND	4	3	1	2	2	2	1	0.81
N1202 PRIMARY PRODUCTION	4	3	1	2	2	2	0	0.81
N1203 NUTRIENT UPTAKE STUDIES	3	4	0	2	2	2	0	0.79
N1204 STAND. CROP PARTICULATE ORGANIC	3	4	0	2	2	2	0	0.79
N1300 *** SUBSTRATE ***	3	2	3	0	3	1	2	
N1301 SURFACE COMPOSITION - VISUAL	4	2	2	1	3	1	1	0.88

Appendix C6 Cont.

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I	M	Y	GAP
N1302 SURFACE COMPOSITION - MEASURED	3	3	1	1	3	1	1	0.86
N1303 EMBEDDEDNESS - VISUAL	4	2	2	1	3	1	1	0.88
N1304 EMBEDDEDNESS - MEASURED	3	2	4	1	4	1	1	1.06
N1305 SURFACE FINES - VISUAL	4	2	2	1	3	1	1	0.88
N1306 SURFACE FINES - MEASURED	3	2	3	13		1	0	1.00
N1307 PEBBLE COUNTS	2	3	1	12		1	0	0.92
N1308 CORE SAMPLE	3	3	1	1	2	2	0	0.95
N1309 BEADLOAD	3	2	3	1	3	1	0	1.00
N1310 % BEDROCK	2	2	2	1	2	1	1	1.00
N1400 . ** HABITAT TYPE AND COVER . **	1	3	3	1	3	0	2	
N1401 HABITAT CLASS OR CHANNEL UNIT	2	3	3	2	4	0	0	0.91
N1402 AREA BY HABITAT CLASS/UNIT	1	3	3	2	4	0	0	0.98
N1403 VOLUME BY HABITAT CLASS/UNIT	1	3	3	2	4	0	0	0.98
N1404 POOL:RIFFLE RATIO	2	4	3	2	4	0	0	0.90
N1405 POOL QUALITY	2	4	3	3	4	0	0	0.87
N1406 POOL FREQUENCY	3	2	3	2	4	0	0	0.86
N1407 MICROHABITAT FORMED BY	2	3	2	2	4	0	0	0.86
N1408 MICROHABITAT DIVERSITY	2	3	2	2	4	0	0	0.86
N1409 AMOUNT OF COVER	2	3	4	2	5	0	1	0.97
N1410 TYPE OF COVER	3	3	2	2	4	0	2	0.80
N1411 COVER COMPLEXITY	2	4	2	2	4	0	2	0.86
N1412 WOODY DEBRIS COUNT	1	3	3	2	4	0	0	0.98
N1413 WOODY DEBRIS VOLUME	2	2	4	2	5	0	0	0.98
N1414 OVERHANGING VEGETATION	1	3	3	2	4	0	0	0.98
N1415 UNDERCUT BANKS	1	3	3	2	4	0	0	0.98
N1416 MAX. DEPTH BY CHANNEL UNIT	2	3	2	2	4	0	0	0.86
N1500 . ** RIPARIAN AND STREAMBANKS . **	2	2	3	1	3	0	0	
N1501 CONDITION OF RIPARIAN ZONE	2	1	6	3	3	1	1	1.07
N1502 RIPARIAN VEGETATION TYPE	1	3	4	2	4	1	1	1.11
N1503 RIPARIAN VEG. DIVERSITY	2	1	5	3	2	1	0	1.02
N1504 STREAMBANK STABILITY	2	3	4	2	3	1	0	1.03
N1505 AMOUNT OF SHADE	2	2	5	3	2	1	1	1.00
N1506 R4 USFS GREENLINE	2	0	2	2	1	0	0	0.75
N1507 WOODY SPECIES REGENERATION	2	1	5	3	3	1	0	1.04
N1508 ENCROACHMENTS IN RIPARIAN ZONE	2	1	5	3	3	1	0	1.04
N1509 FLOODPLAIN WIDTH	3	2	3	3	2	1	0	0.86
N1510 GRAZING UTILIZATION	2	1	5	2	3	1	0	1.10
N1511 SERAL (SUCCESSIONAL) STAGE	2	1	3	4	1	0	0	0.77
N1512 WOODY DEBRIS RECRUITMENT POTENTIAL	2	1	4	2	3	1	0	1.05
N1513 VEGETATION CONDITION IN FLOODPLAIN	3	1	4	2	3	1	0	0.98
N1514 POTENTIAL NATURAL VEGETATION	3	1	4	3	2	1	0	0.91
N1515 IN-CHANNEL LWD	2	1	4	2	3	1	0	1.05
N1516 IN-FLOODPLAIN LWD	2	2	3	2	3	1	0	0.99
N1600 . ** HABITAT ANALYSIS AND SUMMARIES . **	2	2	2	1	3	0	0	
N1601 SEDIMENT YIELD MODELS	1	5	1	1	3	0	0	0.89
N1602 R1R4 FISHSED	1	1	1	1	1	0	0	0.80
N1603 LIMITING FACTORS ANALYSIS	1	4	3	2	1	3	0	1.23
N1604 CHANNEL DYNAMICS	4	2	2	3	1	1	0	0.73
N1605 CHANNEL GEOMETRY	4	2	2	2	2	1	0	0.80
N1606 CHANNEL STABILITY	3	3	2	3	1	1	0	0.78
N1607 IFIM MINIMUM STREAM FLOW	1	4	4	0	5	1	0	1.27
N1608 EPA RAPID BIOASSESSMENT	3	2	1	1	2	1	1	0.83
N1609 BIOTIC CONDITION INDEX	3	2	1	1	3	0	1	0.74
N1610 RESIDUAL POOL DEPTH	4	1	1	1	3	0	0	0.67
N1611 RIPARIAN RATE OF RECOVERY	3	1	5	2	4	1	1	1.04
N1612 REMOTE SENSING/AERIAL PHOTOS	3	3	2	3	3	0	0	0.75
N1613 GIS APPLICATIONS	4	3	3	1	5	1	1	0.95
N1614 CHANNEL UNIT DISTRIBUTION	4	1	1	1	3	0	0	0.67
N1615 CHANNEL NETWORK RIPARIAN ANALYSIS	3	2	3	1	3	1	0	1.00
N1616 CUMULATIVE EFFECTS ANALYSIS	0	4	5	0	5	2	0	1.49

***SYSTEM TECHNICAL VIEW"

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned: 52

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I	M	Y	
N700 . **DRAINAGE BASIN CHARACTERISTICS .**	7	4	5	6	8	0	3	GAP
N701 ECOREGION	4	4	3	5	4	0	0	0.75
N702 GEOLOGY	4	3	3	5	3	0	0	0.72
N703 FIRE HISTORY	6	3	2	3	6	0	0	0.70
N704 LANDUSE - QUALITATIVE	2	9	3	5	7	0	1	0.86
N705 LANDUSE - QUANTITATIVE	3	7	7	3	10	0	0	1.00
N706 LANDOWNERSHIP	5	6	2	6	4	0	1	0.68
N707 RIVER PROTECTION	1	8	6	7	4	0	3	0.89
N708 WATERSHED MANAGEMENT	1	7	11	4	11	0	0	1.11
N709 STREAMSIDE MANAGEMENT	0	7	10	2	10	0	1	1.19
N710 VALLEY SEGMENT TYPE	3	5	3	1	8	0	0	0.95
N711 LANDTYPE	5	3	1	2	5	1	0	0.73
N712 ROAD CONSTRUCTION	4	4	4	3	6	0	0	0.86
N713 VEGETATION	3	5	5	3	6	0	0	0.92
N714 SOILS	3	7	2	3	5	0	0	0.81
N715 CLIMATE	6	4	2	4	4	0	0	0.67
N800 . ** STREAM CHANNEL CHARACTERISTICS ***	3	8	4	1	12	0	3	
N801 CHANNEL TYPE	4	3	5	4	5	0	2	0.85
N802 STREAM GRADIENT	4	4	6	6	5	0	5	0.84
N803 STREAM ORDER	5	6	2	6	4	0	2	0.68
N804 SINUOSITY	7	3	2	4	6	0	3	0.66
N805 WETTED WIDTH	2	5	4	2	7	0	1	0.98
N806 BANKFULL CHANNEL	3	4	3	2	6	0	2	0.89
N807 MEAN DEPTH	4	4	3	2	6	0	2	0.85
N808 MAXIMUM DEPTH	3	4	2	1	6	0	1	0.88
N809 PROFILE	6	3	1	2	6	0	2	0.67
N810 AREA/VOLUME BY CHANNEL UNIT TYPES	2	4	2	0	6	0	1	1.00
N900 . ** BARRIERS, DIVERSIONS, SCREENS . **	4	6	2	3	9	0	0	
N901 NATURAL BARRIERS, FALLS, ETC.	4	5	5	4	7	0	3	0.88
N902 MANMADE BARRIERS, CULVERTS, ETC.	2	7	7	3	10	0	3	1.04
N903 WATER DIVERSIONS, DEWATERING	1	6	8	3	9	0	0	1.10
N904 SCREENED/UNSCREENED DIVERSIONS	1	8	6	3	10	0	1	1.05
N905 INTERMITTANT BARRIERS	4	4	2	2	7	0	1	0.81
N1000 . ** WATER QUANTITY . **	3	5	8	2	12	0	1	
N1001 STREAMFLOW	2	6	10	7	7	0	3	0.98
N1002 STREAM STAGE	5	0	3	3	3	0	1	0.70
N1003 ANNUAL HYDROGRAPH	4	3	5	4	6	0	1	0.87
N1004 INSTREAM WATER RIGHTS	3	4	7	7	4	1	1	0.91
N1005 DIVERSION WATER RIGHTS	2	4	8	6	6	0	1	0.97
N1006 GAGED IRRIGATION FLOW	3	2	6	1	8	0	0	1.08
N1100 *** WATER QUALITY ***	3	4	6	1	11	0	1	
N1101 TEMPERATURE - INSTANTANEOUS	8	7	4	5	8	0	7	0.75
N1102 TEMPERATURE - MAX/MIN	5	9	7	4	10	0	6	0.92
N1103 TEMPERATURE - CONTINUOUS	5	7	5	3	8	0	3	0.88
N1104 TURBIDITY	9	3	4	2	8	0	4	0.77
N1105 CONDUCTIVITY	6	6	2	2	8	1	5	0.82
N1106 DISSOLVED OXYGEN	11	2	4	4	10	0	5	0.69
N1107 TOTAL DISSOLVED SOLIDS	9	3	1	1	9	0	2	0.66
N1108 NUTRIENTS	9	2	3	1	10	0	3	0.75
N1109 METALS	8	5	1	2	8	1	2	0.72
N1110 ALKALINITY/HARDNESS	7	5	2	1	10	0	3	0.79
N1111 PI-I	9	4	1	2	9	0	4	0.65
N1200 . ** INVERTEBRATES, GENERAL BIOTIC .**	8	1	1	0	8	1	0	
N1201 MACROINVERTEBRATE ABUND	8	4	3	2	10	0	3	0.77
N1202 PRIMARY PRODUCTION	6	2	2	0	6	1	0	0.86
N1203 NUTRIENT UPTAKE STUDIES	6	1	1	0	5	2	0	0.80
N1204 STAND. CROP PARTICULATE ORGANIC	4	3	1	0	6	1	0	0.88
N1300 . ** SUBSTRATE . **	4	5	2	0	9	1	0	
N1301 SURFACE COMPOSITION - VISUAL	4	4	3	2	6	0	3	0.85

Appendix C7 Cont.

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I	M	Y	GAP
N1302 SURFACE COMPOSITION - MEASURED	G	3	2	1	6	1	1	0.82
N1303 EMBEDDEDNESS - VISUAL	4	5	1	2	5	0	0	0.74
N1304 EMBEDDEDNESS - MEASURED	5	3	4	2	6	1	1	0.91
N1305 SURFACE FINES - VISUAL	3	5	3	2	6	0	2	0.89
N1306 SURFACE FINES - MEASURED	3	4	2	0	6	0	1	0.94
N1307 PEBBLE COUNTS	3	2	2	0	6	0	1	0.93
N1308 CORE SAMPLE	3	2	2	0	5	1	0	1.01
N1309 BEADLOAD	2	3	2	0	5	0	0	1.00
N1310 % BEDROCK	3	2	3	1	5	0	1	0.92
N1400 . ** HABITAT TYPE AND COVER ***	4	6	5	0	13	1	3	
N1401 HABITAT CLASS OR CHANNEL UNIT	3	3	5	2	7	0	3	0.98
N1402 AREA BY HABITAT CLASS/UNIT	3	4	4	2	7	0	3	0.94
N1403 VOLUME BY HABITAT CLASS/UNIT	4	3	1	1	5	0	1	0.75
N1404 POOL:RIFFLE RATIO	1	8	3	2	8	0	3	0.98
N1405 POOL QUALITY	4	4	2	2	6	0	3	0.80
N1406 POOL FREQUENCY	3	4	2	2	5	0	2	0.83
N1407 MICROHABITAT FORMED BY	3	3	2	1	5	0	1	0.87
N1408 MICROHABITAT DIVERSITY	3	2	3	1	5	0	1	0.92
N1409 AMOUNT OF COVER	1	8	3	2	7	0	3	0.98
N1410 TYPE OF COVER	4	5	2	1	7	0	1	0.86
N1411 COVER COMPLEXITY	3	5	2	1	6	0	1	0.89
N1412 WOODY DEBRIS COUNT	3	4	4	1	6	1	1	1.05
N1413 WOODY DEBRIS VOLUME	3	6	1	1	6	0	1	0.84
N1414 OVERHANGING VEGETATION	1	6	2	1	5	0	2	0.97
N1415 UNDERCUT BANKS	2	5	3	2	6	0	2	0.93
N1416 MAX. DEPTH BY CHANNEL UNIT	3	2	3	1	5	0	1	0.92
N1500 . ** RIPARIAN AND STREAMBANKS . **	1	7	5	1	10	1	1	
N1501 CONDITION OF RIPARIAN ZONE	0	5	8	2	7	1	1	1.25
N1502 RIPARIAN VEGETATION TYPE	4	4	6	4	7	0	2	0.91
N1503 RIPARIAN VEG. DIVERSITY	3	5	4	3	6	0	2	0.89
N1504 STREAMBANK STABILITY	1	7	6	1	10	0	2	1.13
N1505 AMOUNT OF SHADE	2	5	3	1	6	0	1	0.98
N1506 R4 USFS GREENLINE	2	3	0	0	5	0	1	0.80
N1507 WOODY SPECIES REGENERATION	2	5	2	1	5	0	1	0.92
N1508 ENCROACHMENTS IN RIPARIAN ZONE	2	5	3	1	6	0	2	0.98
N1509 FLOODPLAIN WIDTH	2	6	0	2	4	0	1	0.75
N1510 GRAZING UTILIZATION	0	5	5	2	6	0	2	1.11
N1511 SERAL (SUCCESSIONAL) STAGE	2	4	1	2	4	0	1	0.80
N1512 WOODY DEBRIS RECRUITMENT POTENTIAL	2	4	4	1	6	0	0	1.03
N1513 VEGETATION CONDITION IN FLOODPLAIN	2	5	2	3	4	0	2	0.82
N1514 POTENTIAL NATURAL VEGETATION	2	2	4	2	4	0	0	0.96
N1515 IN-CHANNEL LWD	2	4	5	1	7	0	2	1.07
N1516 IN-FLOODPLAIN LWD	2	6	2	1	6	0	1	0.93
N1600 . ** HABITAT ANALYSIS AND SUMMARIES ***	2	9	0	1	8	1	1	
N1601 SEDIMENT YIELD MODELS	7	3	0	1	8	0	0	0.62
N1602 R1R4 FISHSED	3	2	0	1	4	1	0	0.70
N1603 LIMITING FACTORS ANALYSIS	2	5	3	1	7	2	1	1.11
N1604 CHANNEL DYNAMICS	3	3	1	0	5	1	0	0.94
N1605 CHANNEL GEOMETRY	5	1	0	0	4	1	0	0.65
N1606 CHANNEL STABILITY	4	3	0	0	5	0	0	0.71
N1607 IFIM MINIMUM STREAM FLOW	4	5	3	1	10	1	0	0.96
N1608 EPA RAPID BIOASSESSMENT	5	2	0	1	5	1	1	0.64
N1609 BIOTIC CONDITION INDEX	6	1	0	1	5	0	0	0.53
N1610 RESIDUAL POOL DEPTH	4	2	1	1	5	1	1	0.79
N1611 RIPARIAN RATE OF RECOVERY	4	3	1	1	5	0	0	0.75
N1612 REMOTE SENSING/AERIAL PHOTOS	5	4	1	3	6	0	2	0.69
N1613 GIS APPLICATIONS	4	5	3	3	8	0	3	0.84
N1614 CHANNEL UNIT DISTRIBUTION	3	3	0	1	4	1	0	0.75
N1615 CHANNEL NETWORK RIPARIAN ANALYSIS	3	4	0	1	4	1	0	0.79
N1616 CUMULATIVE EFFECTS ANALYSIS	1	4	4	1	6	2	1	1.24

SUBBASIN TECHNICAL VIEW

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 125

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I	M	Y	
N700 ***DRAINAGE BASIN CHARACTERISTICS***	10	21	12	10	22	2	6	GAP
N701 ECOREGION	10	24	8	17	17	0	2	0.78
N702 GEOLOGY	12	23	7	21	13	0	2	0.72
N703 FIRE HISTORY	18	14	4	13	17	0	2	0.66
N704 LANDUSE - QUALITATIVE	6	29	14	17	20	1	6	0.89
N705 LANDUSE - QUANTITATIVE	7	24	20	13	26	1	6	0.98
N706 LANDOWNERSHIP	17	19	6	23	11	0	5	0.65
N707 RIVER PROTECTION	9	23	18	17	20	1	8	0.90
N708 WATERSHED MANAGEMENT	4	26	25	8	33	2	3	1.11
N709 STREAMSIDE MANAGEMENT	2	28	25	8	31	2	9	1.13
N710 VALLEY SEGMENT TYPE	13	21	7	8	22	2	3	0.85
N711 LANDTYPE	15	20	5	13	15	3	2	0.75
N712 ROAD CONSTRUCTION	10	22	13	16	18	1	5	0.85
N713 VEGETATION	8	28	10	11	22	1	3	0.89
N714 SOILS	9	30	5	16	16	0	2	0.76
N715 CLIMATE	14	24	4	19	12	0	1	0.67
N800 ***STREAM CHANNEL CHARACTERISTICS***	3	13	4	3	13	0	6	
N801 CHANNEL TYPE	3	19	6	9	14	1	12	0.90
N802 STREAM GRADIENT	2	25	2	9	17	0	12	0.85
N803 STREAM ORDER	5	18	2	13	9	0	7	0.73
N804 SINUOSITY	3	20	1	3	16	1	6	0.91
N805 WETTED WIDTH	3	20	4	6	17	1	11	0.92
N806 BANKFULL CHANNEL	3	18	3	6	14	1	7	0.89
N807 MEAN DEPTH	5	18	4	5	18	1	13	0.91
N808 MAXIMUM DEPTH	3	19	2	3	19	1	9	0.94
N809 PROFILE	3	17	2	3	16	2	9	0.95
N810 AREA/VOLUME BY CHANNEL UNIT TYPES	4	17	3	3	16	3	10	0.98
N900 ***BARRIERS, DIVERSIONS, SCREENS***	1	7	7	3	11	0	5	
N901 NATURAL BARRIERS, FALLS, ETC.	1	17	8	12	13	0	12	0.92
N902 MANMADE BARRIERS, CULVERTS, ETC.	1	15	9	8	16	0	12	0.99
N903 WATER DIVERSIONS, DEWATERING	1	11	14	7	18	0	9	1.10
N904 SCREENED/UNSCREENED DIVERSIONS	1	13	12	8	17	0	9	1.04
N905 INTERMITTANT BARRIERS	4	15	4	4	17	0	7	0.91
N1000 ***WATER QUANTITY***	1	5	7	2	10	0	1	
N1001 STREAMFLOW	1	11	12	6	14	0	8	1.07
N1002 STREAM STAGE	1	11	5	3	12	0	3	1.02
N1003 ANNUAL HYDROGRAPH	4	10	6	6	11	0	3	0.89
N1004 INSTREAM WATER RIGHTS	1	10	9	7	10	0	5	1.00
N1005 DIVERSION WATER RIGHTS	2	8	9	6	10	0	2	1.00
N1006 GAGED IRRIGATION FLOW	3	6	7	2	10	1	0	1.08
N1100 ***WATER QUALITY***	1	4	6	1	9	0	2	
N1101 TEMPERATURE - INSTANTANEOUS	4	9	9	6	12	2	11	1.01
N1102 TEMPERATURE - MAX/MIN	5	9	11	1	20	2	9	1.14
N1103 TEMPERATURE - CONTINUOUS	3	9	12	1	16	3	6	1.25
N1104 TURBIDITY	7	13	5	2	17	2	4	0.96
N1105 CONDUCTIVITY	4	13	3	5	12	2	7	0.90
N1106 DISSOLVED OXYGEN	5	11	6	3	15	3	8	1.02
N1107 TOTAL DISSOLVED SOLIDS	5	11	3	2	13	3	6	0.97
N1108 NUTRIENTS	6	10	5	1	12	5	4	1.10
N1109 METALS	4	9	5	0	12	3	4	1.14
N1110 ALKALINITY/HARDNESS	4	9	4	1	12	3	5	1.07
N1111 PH	3	11	4	2	12	3	6	1.06
N1200 ***INVERTEBRATES, GENERAL BIOTIC***	3	12	1	0	12	1	4	
N1201 MACROINVERTEBRATE ABUND	5	15	1	0	12	5	4	1.06
N1202 PRIMARY PRODUCTION	6	10	1	0	8	6	1	1.09
N1203 NUTRIENT UPTAKE STUDIES	7	6	1	0	5	7	0	1.11
N1204 STAND. CROP PARTICULATE ORGANIC	5	7	1	0	6	5	1	1.10
N1300 *** SUBSTRATE ***	3	8	4	1	9	2	4	
N1301 SURFACE COMPOSITION - VISUAL	3	16	5	4	15	1	10	0.97

Appendix C8 Cont.

CIS SURVEY
HABITAT RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

	NEEDS			AVAILABILITY			COLL.	
	N			A				
	H	I	C	A	I		MY	GAP
N1302 SURFACE COMPOSITION - MEASURED	5	13	2	2	14	2	4	0.93
N1303 EMBEDDEDNESS - VISUAL	5	14	2	2	12	2	8	0.93
N1304 EMBEDDEDNESS - MEASURED	5	11	5	1	14	2	3	1.03
N1305 SURFACE FINES - VISUAL	4	14	3	4	10	2	8	0.92
N1306 SURFACE FINES - MEASURED	4	11	4	1	12	3	2	1.07
N1307 PEBBLE COUNTS	4	8	2	1	9	2	2	0.97
N1308 CORE SAMPLE	8	9	1	1	10	3	2	0.87
N1309 BEADLOAD	7	7	3	1	11	2	2	0.92
N1310 % BEDROCK	8	8	2	2	12	1	5	0.81
N1400 .**HABITAT TYPE AND COVER .**	2	7	7	1	9	2	4	
N1401 HABITAT CLASS OR CHANNEL UNIT	3	15	5	5	12	1	10	0.94
N1402 AREA BY HABITAT CLASS/UNIT	4	15	5	5	12	2	9	0.95
N1403 VOLUME BY HABITAT CLASS/UNIT	5	11	4	2	13	2	6	0.98
N1404 POOL:RIFFLE RATIO	1	15	7	5	12	2	10	1.05
N1405 POOL QUALITY	2	13	9	3	16	2	8	1.12
N1406 POOL FREQUENCY	2	12	9	4	14	2	8	1.10
N1407 MICROHABITAT FORMED BY	3	9	3	1	9	2	4	1.04
N1408 MICROHABITAT DIVERSITY	3	10	3	1	10	2	4	1.04
N1409 AMOUNT OF COVER	2	17	7	4	14	2	8	1.04
N1410 TYPE OF COVER	3	15	5	2	13	2	7	1.04
N1411 COVER COMPLEXITY	5	10	4	1	12	3	4	1.04
N1412 WOODY DEBRIS COUNT	5	12	6	2	12	4	6	1.08
N1413 WOODY DEBRIS VOLUME	5	12	2	0	9	6	4	1.15
N1414 OVERHANGING VEGETATION	3	16	6	6	10	3	10	0.98
N1415 UNDERCUT BANKS	5	15	5	5	11	3	10	0.95
N1416 MAX. DEPTH BY CHANNEL UNIT	3	13	2	2	8	4	5	1.05
N1500 .**RIPARIAN AND STREAMBANKS .**	1	8	7	1	10	2	5	
N1501 CONDITION OF RIPARIAN ZONE	1	13	12	3	17	1	10	1.16
N1502 RIPARIAN VEGETATION TYPE	2	15	4	2	13	2	7	1.05
N1503 RIPARIAN VEG. DIVERSITY	5	15	2	3	13	2	8	0.91
N1504 STREAMBANK STABILITY	1	16	10	3	17	2	10	1.14
N1505 AMOUNT OF SHADE	2	19	5	0	19	2	8	1.11
N1506 R4 USFS GREENLINE	3	10	1	1	9	2	4	0.97
N1507 WOODY SPECIES REGENERATION	1	13	3	1	9	4	5	1.19
N1508 ENCROACHMENTS IN RIPARIAN ZONE	1	13	6	1	14	2	3	1.16
N1509 FLOODPLAIN WIDTH	6	8	3	0	12	2	3	0.98
N1510 GRAZING UTILIZATION	2	15	8	2	17	2	7	1.12
N1511 SERAL (SUCCESSIONAL) STAGE	3	14	1	2	10	3	4	0.98
N1512 WOODY DEBRIS RECRUITMENT POTENTIAL	1	14	4	2	11	3	4	1.11
N1513 VEGETATION CONDITION IN FLOODPLAIN	2	15	2	2	11	3	4	1.03
N1514 POTENTIAL NATURAL VEGETATION	2	15	2	2	9	4	2	1.07
N1515 IN-CHANNEL LWD	3	10	7	2	12	3	5	1.13
N1516 IN-FLOODPLAIN LWD	4	12	2	0	11	4	3	1.09
N1600 .**HABITAT ANALYSIS AND SUMMARIES .**	1	8	4	0	11	1	2	
N1601 SEDIMENT YIELD MODELS	4	10	6	3	13	2	3	1.02
N1602 R1R4 FISHSED	4	6	4	2	9	2	3	1.00
N1603 LIMITING FACTORS ANALYSIS	4	10	8	0	15	4	3	1.22
N1604 CHANNEL DYNAMICS	3	12	1	0	12	3	1	1.04
N1605 CHANNEL GEOMETRY	3	11	1	0	11	3	0	1.05
N1606 CHANNEL STABILITY	4	15	2	0	17	3	4	1.03
N1607 IFIM MINIMUM STREAM FLOW	5	14	2	2	11	4	5	0.99
N1608 EPA RAPID BIOASSESSMENT	6	6	2	0	6	7	2	1.17
N1609 BIOTIC CONDITION INDEX	7	8	1	0	8	6	3	1.03
N1610 RESIDUAL POOL DEPTH	3	11	2	0	11	4	1	1.12
N1611 RIPARIAN RATE OF RECOVERY	4	12	2	1	12	3	2	1.01
N1612 REMOTE SENSING/AERIAL PHOTOS	6	7	1	0	10	1	1	0.86
N1613 GIS APPLICATIONS	5	9	3	0	11	3	1	1.05
N1614 CHANNEL UNIT DISTRIBUTION	3	7	1	1	6	3	3	1.01
N1615 CHANNEL NETWORK RIPARIAN ANALYSIS	3	7	2	0	8	2	1	1.06
N1616 CUMULATIVE EFFECTS ANALYSIS	4	7	11	0	15	5	3	1.32

APPENDIX D - HATCHERY PRODUCTION RESULTS

Hatchery Production Regional Results
Gap Factor Comparisons
Survey Results, System Technical View
Survey Results, Subbasin View
Survey Results, Policy View
Responses by State Agencies
Responses by Federal Agencies
Responses by Tribal Agencies
Responses by Others
Washington State Responses
Oregon State Responses
Idaho State Responses
Annotated Comments
User Contributed Questions
Hatchery Section Respondents

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

		NEEDS			AVAILABILITY			COLL
		H	I	C	A	I	M	Y
	Total Number of Surveys Returned 118							
H100	***ESCAPEMENT and SPAWNERS***	8	14	37	29	19	0	15 CAP
H101	Facility Where Spawning Occurs	10	26	24	43	12	0	23 90
H102	Sex Ratio of Returning Adults	15	32	11	38	13	0	m 0.70
H103	Sex Ratio of Spawners Used	12	28	13	33	14	1	21 0.76
H104	Escapement Estimate (total run-all stocks)	7	21	36	27	26	3	15 1.01
H105	Broodstock Total Return Estimate (to F.W.)	5	25	26	26	24	2	14 a96
H106	Broodstock Age Structure	9	32	18	34	18	1	14 a82
H107	Broodstock Fecundity	14	27	12	32	17	1	19 0.75
H108	Broodstock Selection Methods	10	19	24	23	22	5	is a96
H109	Broodstock Health Conditions	7	21	24	24	23	2	is 0.95
H110	Hatchery/Wild Ratio Returned to Hatchery	11	21	27	16	32	7	14 LOS
H111	Broodstock Inclusion Ratio of Wild Fish	11	18	25	13	29	7	11 1.06
H112	Broodstock Collection Type	12	18	16	36	14	2	13 0.81
H113	Date(s) Broodstock Returned to Hatchery	14	24	19	32	19	0	19 0.79
H114	Dates of Spawning	14	25	18	35	13	1	m a76
H115	Length Frequency of Spawners by Sex	22	24	10	32	17	3	14 a70
H117	Weight of Spawners	23	14	2	16	14	12	7 0.70
H118	Stock of Origin	6	26	3	25	22	4	15 a99
H119	Electrophoretic Profile of Stock	9	22	11	4	24	11	6 1.12
H120	Repeat Spawning Percentage for Steelhead	21	10	4	12	10	11	6 0.75
H121	Broodstock Mark Return Count	6	20	28	31	16	0	16 0.91
H122	Scale Age vs. Mark Age Correction Factor	16	21	9	10	25	8	7 0.90
H123	Hatchery sport harvest	10	19	31	28	20	4	11 0.95
H124	Hatchery tribal harvest	11	14	31	18	26	6	8 LOS
H199	Other	0	3	3	1	3	0	2 1.11
H199	Other	0	0	2	0	1	0	1 1.50
H200	***HATCHERY INFORMATION***	4	3	7	9	4	0	3
H201	Hatchery/Facility Where Eggs Hatched	10	23	17	34	10	0	21 a n
H202	Hatchery/Facility Fish Last Reared	9	27	17	35	10	0	21 a n
H203	Facilities where Fish Previously Reared	9	26	14	34	10	0	19 a76
H204	Hatchery Number(s) or Code(s)	11	19	15	36	6	1	16 a74
H205	Source of Water @ Hatchery	10	25	15	37	7	1	20 0.75
H206	Hatchery Water Quantity	11	25	13	32	12	a	18 a75
H207	Hatchery Water Quality	II	21	18	29	14	2	17 0.82
H208	Hatchery Effluent Quality	IS	24	7	25	16	1	17 0.71
H209	Hatchery Capacity	6	28	17	36	9	0	19 a79
H210	Hatchery Methods/Procedures	9	17	23	25	15	3	19 0.91
H211	Published Hatchery Goals	12	25	17	26	19	0	12 0.81
H212	Major Production Limiting Factors	8	25	20	21	19	5	16 0.95
H213	Annual Hatchery Budgets	21	13	11	30	10	6	II a65
H299	Other	0	0	2	1	1	0	2 1.20
H299	Other	0	0	1	0	0	1	1 3.00
H300	***REARING INFORMATION***	3	4	4	6	3	0	2
H301	Feeding History (diet)	14	19	16	33	11	0	19 a74
H302	Growth Rate	11	24	13	35	7	1	17 a73
H303	Rearing Density	7	18	28	32	13	1	18 0.90
H304	Rearing Water Temperature	8	27	15	37	6	0	19 0.76
H305	Number of Ponds Used in Rearing / Types	17	19	10	33	6	0	17 a66
H306	Condition Factor	16	22	12	27	14	1	12 a73
H307	Disease History (Inoculations/Treatments)	7	21	2s	32	13	1	17 0.69
H308	Transfer History & Methods	9	23	19	32	12	0	17 0.81
H309	Days Reared	16	16	11	33	5	0	14 a66
H399	Other	0	0	1	1	0	0	1 1.00
H399	Other	0	0	0	0	0	0	0 0.00
H400	***RELEASE INFORMATION***	1	5	13	11	5	0	4
H401	Total Number Released	7	14	49	42	16	0	24 0.95
H402	Counting/Estimation Method (# Released)	8	23	23	29	16	2	17 0.85
H403	Release Location	6	17	44	45	to	0	23 0.91
H404	Release Location Coded	10	19	19	27	10	3	17 0.64
H405	Release Date(s)	4	23	37	46	s	6	23 0.85
H406	Release Information Coded by Brood Year	8	15	24	30	9	1	14 0.86
H407	Release Residualism Data	15	18	15	4	24	12	2 1.11
H408	Release Purpose	6	20	26	24	20	3	10 a97
H419	Physiological Status @ Rel. (e.g. ATPase)	14	23	20	12	30	5	10 1.01
H410	Size @ Release	7	16	41	40	14	1	21 a93
H411	Stage or Class (e.g. fry, smolt, yearling)	6	21	38	41	13	1	22 0.91
H412	Type (e.g. production, experimental, index)	10	m	28	30	17	1	19 0.89
H413	Release Transition	s	19	13	13	17	5	6 a95
H414	Outmigration Timing	13	15	27	14	32	2	10 1.00
H415	Riverine Water Conditions After Release	17	22	14	12	26	6	6 0.91
H416	Riverine Habitat Inventory	17	23	5	9	23	5	1 as2
H417	CWT Marking Data	6	18	38	42	10	0	IS 0.90
H418	PIT Tagging Data	10	15	25	26	11	0	6 0.85
H419	Fin Clip Data	5	14	31	31	11	1	7 a93
H420	Chemical Marking Data	9	15	14	16	IS	1	4 0.66
H421	Natural Missing Adipose Fin Percentage	15	17	12	13	16	6	3 0.88
H422	Lot Number	12	20	0	28	8	0	14 0.69
H499	Other	0	2	3	2	2	1	2 1.18
H499	Other	0	1	1	2	0	0	1 0.83
H500	***SURVIVAL RATES	3	4	12	7	11	0	5
H501	Prespawning Prehatchery Survival Rate	11	22	m	8	20	7	0 1.07
H502	Prespawning @ Hatchery Survival Rate	13	21	22	29	17	1	II 0.83
H503	Egg to Fry Survival Rate	11	25	1.9	35	11	0	16 0.77
H504	Fry to Smolt Survival Rate	11	25	19	35	12	0	17 0.78
H505	Smolt Outmigration Survival Rate	7	17	36	V	32	lb	6 1.25
H506	Smolt to Adult Survival Rate	6	17	43	12	39	6	10 1.22
H507	Escapement to Smolt Survival Rate	Y	21	m	8	24	10	4 I 14
H599	Other	0	0	2	0	1	0	0 1.50
H599	Other	0	1	0	0	1	0	0 1.00

Appendix Table D-L COMPARISONS OF DATA GAPS
CIS SURVEY
HATCHERY RESULTS

GAP FACTORS (see appendices for details)
((Nb + (Nt*2) + (Nc*3))/(Nh + Ni + Nc))/(((Aa*3) + (Ai*2) + Am)/(Aa + Ai + Am))
Where N-NEEDS. b = helpful, t = important, c = critical
A = AVAILABILITY, a = available, i = inadequate, m = missing

QUESTION NUMBER	INDEX	FED AGENCY	STATE AGENCY	TRIBE	SUB-BASIN TECH	SYSTEM TECH	POLICY	WASHINGTON STATE	OREGON STATE	IDAHO STATE	ALL COLUMBIA R
H100	***ESCAPEMENT and SPAWNERS***										
H101	Facility Where Spawning Occurs	a74	0.81	0.91	a84	0.76	0.5[illegible]	a79	an	a64	0.60
H102	Sex Ratio of Returning Adults	0.[illegible]	0.69	1.11	0.71	a m	0.6[illegible]	a66	a m	a n	0.70
H103	Sex Ratio of Spawners Used	0.67	0.76	1.11	a m	a74	0.7[illegible]	a73	an	0.79	0.76
H104	Escapement Estimate (total run-all stocks)	0.89	LW.	1.43	1.04	1.02	0.4[illegible]	1.10	0.86	a98	1.01
H105	Broodstock Total Return Estimate (to F.W.)	0.82	a96	1.43	0.95	0.98	0.9[illegible]	1.00	0.88	a97	0.96
H106	Broodstock Age Structure	a71	0.82	1.11	a m	0.86	0.7[illegible]	0.83	0.73	0.85	0.82
H107	Broodstock Fecundity	0.65	0.75	0.90	a n	0.75	ad	a74	0.76	0.75	0.75
H108	Broodstock Selection Methods	0.74	0.95	1.83	a92	0.95	1.[illegible]	0.92	0.80	1.13	0.96
H109	Broodstock Health Conditions	0.81	a92	1.71	a97	0.91	1.0[illegible]	a92	0.78	1.11	0.95
H110	Hatchery/Wild Ratio Returned to Hatchery	0.82	Los	1.71	LO6	1.12	0.5[illegible]	1.02	0.87	1.19	1.05
H111	Broodstock Inclusion Ratio of Wild Fish	a n	1.08	1.71	1.15	1.06	0.5[illegible]	0.95	0.95	1.32	1.66
H112	Broodstock Collection Type	a68	a m	1.00	a90	a74	a m	a73	0.84	a92	0.81
H113	Date(s) Broodstock Returned to Hatchery	a73	an	1.25	0.83	an	0.7[illegible]	0.81	0.71	0.82	a79
H114	Dates d Spawning	0.63	a n	1.43	0.84	0.68	0.7[illegible]	a78	0.72	an	0.76
H115	Length Frequency of Spawners by Sex	0.52	0.69	L11	a74	a66	0.7[illegible]	0.68	0.61	0.75	a m
H117	Weight of Spawners	0.67	0.65	0.78	a73	0.71	0.5[illegible]	0.76	0.45	0.81	0.70
H118	Stock of Origin	a w	1.01	1.25	1.02	Lo2	a s	a95	a m	1.13	a w
H119	Electrophoretic Profile of Stock	1.17	LO7	1.33	1.16	1.21	0.5[illegible]	1.06	L07	1.28	1.12
H120	Repeat Spawning Percentage for Steelhead	a62	a73	1.33	0.96	0.69	0.4[illegible]	0.71	0.63	a94	a n
H121	Broodstock Mark Return Count	0.83	0.89	1.38	0.90	a97	a +	0.84	0.83	1.03	0.91
H122	Scale Age vs. Mark Age Correction Factor	a n	0.91	1.17	LO2	a93	0.5[illegible]	0.81	as7	1.33	0.90
H123	Hatchery sport harvest	0.95	a94	1.20	LO2	a94	0.8[illegible]	1.00	0.81	a97	0.95
H124	Hatchery tribal harvest	a95	1.08	1.20	1.15	1.07	0.9[illegible]	1.09	a86	1.11	1.0s
H199	Other	1.50	LO3	a m	Lo7	1.17	0.0[illegible]	1.33	0.83	1.00	1.11
H199	Other	a m	1.50	0.00	0.00	1.50	0.0[illegible]	0.00	a m	1.50	1.50
H200	***HATCHERY INFORMATION***										
H201	Hatchery/Facility Where Eggs Hatched	a64	a79	1.00	0.89	0.65	0.0[illegible]	a71	an	0.87	a n
H202	Hatchery/Facility Fish Last Reared	0.65	aw	1.00	0.89	a67	0.6[illegible]	a73	an	0.85	a n
H203	Facilities where Fish Previously Reared	a64	0.76	1.00	a87	0.65	0.0[illegible]	a68	a77	0.88	0.76
H204	Hatchery Number(s) or Code(s)	0.78	0.67	L19	a79	0.68	0.7[illegible]	0.69	a n	as4	a74
H205	Source d Water @ Hatchery	a m	0.75	at32	0.76	an	0.7[illegible]	0.78	a76	0.70	0.75
H206	Hatchery Water Quantity	0.78	a74	a73	a74	a73	0.5[illegible]	0.79	0.75	0.70	0.75
H207	Hatchery Water Quality	an	0.84	0.75	as.5	a84	0.7[illegible]	a m	a n	0.89	0.82
H208	Hatchery Effluent Quality	am	an	0.60	a n	0.76	0.5[illegible]	0.72	0.55	0.79	0.71
H209	Hatchery Capacity	a m	a n	0.90	0.81	0.82	0.0[illegible]	0.76	0.76	0.82	a w
H210	Hatchery Methods/Procedures	a69	0.95	1.00	a97	a92	0.7[illegible]	0.85	a n	1.10	0.91
H211	Published Hatchery Goals	a73	0.81	1.00	as2	0.90	0.0[illegible]	0.81	a74	as7	0.81
H212	Major Production Limiting Factors	a76	aw	1.13	1.08	ass	a x	a95	a71	1.13	0.95
H213	Annual Hatchery Budgets	0.55	0.65	0.60	0.70	0.59	0.0[illegible]	0.66	ass	a67	0.65
H299	Other	am	1.20	am	1.50	1.00	a m	a m	am	1.20	1.20
H299	Other	am	3.00	am	a m	3.00	0.0[illegible]	0.00	0.00	3.00	3.00
H300	***REARING INFORMATION"										
H301	Feeding H i (diet)	a73	an	a83	a m	an	0.54	a66	a69	a93	a74
H302	Growth Rate	a n	0.71	an	0.81	a m	0.55	0.71	a69	a79	a73
H303	Rearing Density	0.87	0.86	1.10	0.90	0.94	0.75	0.82	0.91	1.01	a 9 0
H304	Raring Water Temperature	an	an	0.88	0.81	an	0.0[illegible]	a74	a73	a80	0.76
H305	Number d Ponds Used in Rearing / Types	a73	a64	0.50	0.68	0.65	0.6[illegible]	0.65	0.61	a70	0.66
H306	Condition Factor	a62	0.78	a63	0.88	a u	0.55	a74	0.69	a76	a73
H307	Disease History (Inoculations/Treatments)	am	a89	1.00	0.94	a07	0.75	0.82	a.54	1.01	0.89
H308	Transfer History & Methods	aw	0.78	1.00	0.85	0.84	0.0[illegible]	a74	a76	a96	0.81
H309	Days Reared	a68	a63	a63	a69	0.67	0.54	a66	a73	as9	a66
H399	Other	0.00	1.00	am	a m	1.00	am	0.00	a m	1.00	1.00
H399	Other	a m	urn	a m	a m	a m	0.0[illegible]	a m	am	am	a m
H400	***RELEASE INFORMATION***										
H401	Total Number Released	a.84	a97	Lo4	1.00	a97	0.74	1.01	0.88	a93	0.95
H402	Counting/Estimation Method (# Released)	0.75	0.88	1.25	1.00	am	0.78	0.89	a79	a93	ass
H403	Release Location	as9	0.90	1.00	a96	as7	am	0.90	a92	0.90	0.91
H404	Release Location Coded	a84	as2	1.25	a91	0.78	0.85	a79	a m	a90	as4
H405	Release Date(s)	0.81	as7	1.20	a93	0.85	0.8[illegible]	a.37	0.83	0.93	0.88
H406	Release Information Coded by Brood Year	a78	as4	1.50	a93	0.84	0.7[illegible]	0.85	0.82	0.91	0.86
H407	Release Residualism Data	0.73	1.20	1.17	1.31	LO3	0.58	1.23	1.00	0.99	1.11
H408	Release Purpose	a73	1.02	1.71	Lo7	0.94	a w	0.95	a m	1.09	0.97
H419	Physiological Status @ Rel. (e.g. ATPase)	a98	a97	1.38	1.08	1.06	0.74	a98	a m	1.19	1.01
H410	Size @ Release	a92	a93	1.00	1.00	a m	0.8[illegible]	0.96	0.83	0.95	0.93
H411	Stage or Class (e.g. fry, smolt, yearling)	a n	0.95	0.92	1.m	0.85	0.8[illegible]	0.94	0.88	0.90	091
H412	Type (e.g. production, experimental, index)	0.80	0.91	0.90	0.98	0.82	0.78	0.87	0.84	0.94	0.89
H413	Release Transition	0.60	LO2	1.67	1.05	a m	1.0[illegible]	1.04	0.69	0.95	0.95
H414	Outmigration Timing	LO3	0.97	1.33	Lo4	0.95	1.0[illegible]	a w	0.98	1.03	1.00
H415	Riverine Water Conditions After Release	am	as7	1.29	a98	a m	0.73	0.89	a72	1.02	0.91
H416	Riverine Habitat Inventory	0.81	a m	1.00	a97	a n	0.6[illegible]	0.90	0.68	a82	0.82
H417	CWT Marking Data	a m	a m	1.20	0.96	0.91	0.6[illegible]	0 87	0.88	0.95	0 90
H418	PIT Tagging Data	0.82	a m	1.20	0 89	a87	0.6[illegible]	a m	0.82	0.92	0.85
H419	Fin Clip Data	0.70	0.94	1.33	0.99	a92	0.7[illegible]	0 94	0.86	0 97	0.93
H420	Chemical Marking Data	0.64	0.86	1.13	a w	a w	0.6[illegible]	0.90	0 74	0.89	0.86
H421	Natural Missing Adipose Fin Percentage	0.83	0.82	1.25	0.91	0.86	0.8[illegible]	0.88	0.83	0.93	0 88
H422	Lot Number	0.74	0.68	0.63	0.74	0.68	0.5[illegible]	0.67	0.78	0.68	0 69
H499	Other	3.m	1.00	a m	1.00	1.2[illegible]	0.0[illegible]	1.25	a m	1.00	118
H499	Other	a m	0.83	0 00	0.00	0.83	a m	0.67	0.00	1.00	0.83
H500	***SURVIVAL RATES***										
H501	Prespawning Prehatchery Survival Rate	1.10	1.05	1.33	1.13	1.12	0.8[illegible]	1.02	1 08	1.14	1.07
H502	Prespawning @ Hatchery Survival Rate	0.88	0.80	1.14	0.89	0.79	0.75	0.82	0.85	0.84	0 83
H503	Egg to Fry Survival Rate	a74	0.75	1.00	0.79	a n	0.7[illegible]	a n	0.81	0.75	0 77
H504	Fry to Smolt Survival Rate	a74	a n	L11	0.81	a n	0.7[illegible]	0.78	0.81	0.77	0 78
H505	Smolt Outmigration Survival Rate	1.10	1.30	1.50	1.31	1.28	1.0[illegible]	1.42	1.12	1.17	1.25
H506	Smolt to Adult Survival Rate	1.08	1.26	1.50	L19	1.26	1.1[illegible]	1.34	1.03	1.18	1.22
H507	Escapement to Smolt Survival Rate	a m	1.18	1.83	1.25	1.05	1.0[illegible]	1.23	0.95	1.17	1.14
H599	Other	a m	1.50	0.00	0.00	1.50	0.0[illegible]	0.00	0 00	1.50	1.50
H599	Other	a m	1.00	0 00	a m	1.00	0.0[illegible]	0.00	a m	1.00	1 00
	Average	a74	0.91	1.00	0.86	0.90	0.0[illegible]	0.80	0.71	097	091

SYSTEM TECHNICAL VIEW

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)(M)issingle
Total Number of Surveys Returned 52

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL	
		H	N I	C	A	A I	M	Y	
H 100	***ESCAPEMENT and SPAWNERS***	3	5	16	14	6	0	7	CAP
H101	Facility Where Spawning Occurs	3	14	7	19	3	0	8	a.76
HIO.?	Sex Ratio of Returning Adults	5	15	5	18	3	0	6	a m
H103	Sex Ratio of Spawners Used	5	14	4	14	5	1	5	0.74
H104	Escapement Estimate (total run-all stocks)	3	9	I4	lo	9	2	7	a96 L0?
H105	Broodstock Total Return Estimate (to F.W.)	0	11	10	11	7	1		
H106	Broodstock Age Signature	2	14	9	15	6	1	6	0.66
H107	Broodstock Fecundity	5	13	3	11	9	0	7	0.75
H108	Broodstock Selection Methods	3	10	7	9	7	3	5	0.95
H109	Broodstock Health Conditions	4	9	7	9	8	2	4	0.91
H110	Hatchery/Wild Ratio Returned to Hatchery	4	10	11	5	14	4	7	1.12
H111	Broodstock Inst... Ratio of Wild Fish	3	11	8	6	11	4	5	1.06
H112	Broodstock Collection Type	5	9	3	II	4	2	6	a74
H113	Date(s) Broodstock Returned to Hatchery	4	13	5	13	6	0	6	0.76
H114	Dates of Spawning	6	13	3	16	3	1	7	0.68
H115	Length Frequency of Spawners by Sex					5	2	7	a66
tii17	Weight of Spawners	10 6	11 5	3 0	15	7	5	1	0.71
H118	Stock of Origin	1	12	12	10	6	2	6	1.02
H119	Electrophoretic Profile of Stock	1	14	4	1	12	5	4	1.21
H120	Broodstock Mark Return Count	6	10	12	13	8	0	5	0.69 a97
H121									
H122	Hatchery sport harvest Correction Factor	5	8	13	13	17	2	8	a93 a94
H123	Hatchery tribal harvest	4	7	13	7	13	2	6	Lol
H124		0	2	1	0	2	0	2	1.17
H199	Other	0	0	1	0	1	0	1	1.50
H199	Other								
H200	***HATCHERY INFORMATION***		2	3	6	0	0	0	
H201	Hatchery/Facility Where Eggs Hatched	6	11	3	15	3	0	6	0.65
H202	Hatchery/Facility Fish Last Reared	5	15	3	16	3	0	6	0.67
H203	Facilities where Fish Previously Reared	6	11	3	15	3	0	6	0.65
H204					13	2	1	5	a66
H205	Source of Water @ Hatchery(s)	5	8	5	15	1	0	6	0.76
H206	Hatchery Water Quantity	4	6	6	14	2	0	5	a73 a84
H207	Hatchery Water Quality	3	7	8	13	3	1	4	0.76
H208	Hatchery Capacity Quality	4	10	8	13	5	0	5	0.82
H209	Hatchery Methods/Procedures	2	6	7	9	6	1	6	0.92
H210	P - H a - -	3	11	8	8	9	0	4	0.90
H211					9	6	I	6	0.88
H212	Annual Hatchery Budgets; Factors	3	5	6	11	3	0	3	0.59
H213		0	0	I	1	0	0	1	1.00
H299	Other	0	0	1	0	0	I	1	3.00
H299	Other								
H300	***REARING INFORMATION***	2	3	3	6	1	0	1	
H301	Feeding History (diet)	4	7	5	13	3	0	6	a73
H302	Growth Rate	4	8	4	14	2	0	5	a70
H303	Rearing Density	3	6	11	11	6	1	6	a94
H304	Rearing Water Temperature	3	10	4	14	3	0	7	a73
H305	Number of Ponds Used in Rearing / Types	5	6	3	13	2	0	6	0.65
H306	Condition Factor	7	10	2	12	4	0	4	a63
H307	Disease History (Inoculations/Treatments)	3	9	11	14	4	I	5	0.87
H308	Transfer History & Methods	3	9	7	11	6	0		0.84
H309	Days Reared	4	8	2	11	3	0	4	a67
H399	Other	0	0	1	1	0	0	1	1.00
H399	Other	0	0	0	0	0	0	0	0.00
H400	***RELEASE INFORMATION***	1	4	5	6	2	0	1	
H401	Total Number Released	3	5	23	18	7	0	6	a97
H402	Counting/Estimation Method (# Released)	5	12	5	12	4	2	4	0.70
H403	Release Location	4	7	19	21	3	0	7	0.87
H404	Release Location Coded	5	8	7	13	3	I	6	0.16
H405	Release Date(s)	1	13	14	20	2	0	7	0.85
H406	Release Information Coded by Brood Year	3	6	10	13	3	0	3	a84
H407	Release Residualism Data	6	9	3	1	9	4	0	1.03
H408	Release Purpose	2	9	10	12	5	2	3	a94
H419	Physiological Status @ Rel. (e.g. ATPase)	5	10	9	5	12	4	3	1.06
H410	Size @ Release	2	12	14	17	5	1	5	a90
H411	Stage or Class (e.g. fry, smolt, yearling)	4	12	14	16	4	I	4	0.85
H412	Type (e.g. production, experimental, index)	6	10	9	12	6	1	4	0.62
H413	Release Transition	5	7	1	4	5	2	2	0.78
H414	Outmigration Timing	6	5	11	7	10	1	3	0.95
H415	Riverine Water Conditions After Release	7	7	7	5	11	1	1	a89
H416	Riverine Habitat Inventory	6	9	1	4	7	1	0	a75
H417	CWT Marking Data	2	9	16	16	5	0	5	0.91
H418	PIT Tagging Data	3	7	11	12	4	0	2	0.87
H419	Fin Clip Data	1	9	9	II	4	1	I	a92
H420	Chemical Marking Data	5	5	3	5	6	1	0	0.79
H421	Natural Missing Adipose Fin Percentage	6	6	4	4	7	3	0	0.86
H422	Lot Number	4	7	J	10	2	0	3	0.63
H499	Other	0	1	3	2	1	1	2	1.22
H499	Other	O	1	1	2	0	0	1	0.63
H500	***SURVIVAL RATES***	1	3	4	240	2	13	3	1.12
H501	Prespawning Prehatchery Survival Rate	4	IO	8	13	6	0	3	a79
H502	Prespawning @ Hatchery Survival Rate	5	10	6		.	0	4	a n
H503	Egg to Fry Survival Rate	.	IO	7	14	4	0	4	0.7-1
H504	Fry to Smolt Survival Rate	4	IO	17	4	14	2	3	1.28
H505	Smolt Outmigration Survival Rate	1	5	20	4	1s	I	4	1.26
H506	Smolt to Adult Survival Rate	1	7	6	4	9	3	3	1.05
H507	Escapement to Smolt Survival Rate	3	10	I	0	1	0	0	1.50
H599	Other	0	I	0	0	,	0	0	1.00
H599	Other								

SUBBASIN TECHNICAL VIEW

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned: 42

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL.	
		N			A				
	H	I		C	A	I	M	Y	
		GAP							
H100	***ESCAPEMENT and SPAWNERS***	2	6	19	12	9	0	6	GAP
H101	Facility Where Spawning Occurs	5	9	14	19	6	0	13	0.84
H102	Sex Ratio of Returning Adults	8	13	s	15	8	0	13	0.71
H103	Sex Ratio of Spawners Used	5	IO	8	15	6	0	14	a m
H104	Escapement Estimate (total run-all stocks)	2	9	17	I2	12	1	7	1.04
H105	Broodstock Total Return Estimate (to F.W.)	3	II	12	12	II	1	7	a95
H106	- A g e - -	5	15	7	14	10	0	5	0.80
H107	- - y	7	10	8	16	6	1	II	a n
H108	Broodstock Selection Methods	5	8	13	13	10	I	9	a92
H109	Broodstock Health Conditions	I	II	13	13	10	0	10	a97
H110	Hatchery/Wild Ratio Returned to Hatchery	5	8	14	8	14	3	.	1.06
H111	Broodstock Inclusion Ratio of Wild Fish	6	.	15	4	14	3	5	1.15
H112	Broodstock Collection Type	4	7	11	11	8	0	6	a90
H113	Date(s) Broodstock - - -	7	9	12	16	10	0	I2	0.83
H114	Dates of Spawning	5	10	13	19	7	0	I?	a64
H115	Length Frequency of Spawners by Sex	9	11	5	13	10	1	6	a74
H117	Weight of Spawners	13	5	2	7	6	7	5	0.73
H118	Stock of Origin	2	12	14	11	10	2	6	1.02
H119	Electrophoretic Profile of Stock	7	5	5	0	10	6	2	1.16
H120	Repeat Spawning Percentage for Steelhead	11	4	3	2	6	8	2	0.96
H121	Broodstock Mark Return Count	2	9	14	15	5	0	IO	a90
H122	Scale Age vs. Mark Age Correction Factor	7	II	2	1	II	6	3	1.02
H123	Hatchery sport harvest	5	8	15	10	10	3	2	1.02
H124	Hatchery tribal harvest	5	4	15	6	10	4	2	1.15
H199	Other	0	I	2	1	1	0	0	1.07
H199	Other	0	0	1	0	0	0	0	0.00
H200	***[illegible]INFORMATION***	1	1	2	2	2	0	1	
H201	Hatchery/Facility Where Eggs Hatched	2	9	u	15	5	0	13	0.89
H202	Hatchery/Facility Fish Last Reared	2	9	13	15	5	0	13	0.89
H203	Facilities where Fish Previously Reared	I	I2	10	15	5	0	11	a67
H204	Hatchery Number(s) or Code(s)	4	9	10	16	3	0	IO	0.79
H205	Source of Water @ Hatchery	7	II	6	17	5	1	12	0.76
H206	Hatchery Water Quantity	6	14	5	14	8	0	11	0.74
H207	Hatchery Water Quality	5	12	6	12	9	1	10	a ss
H208	Hatchery Effluent Quality	7	11	4	II	9	0	11	a73
H209	Hatchery Capacity	1	14	6	18	3	0	12	0.81
H210	Hatchery Methods/Procedures	4	7	14	12	7	2	12	a97
H211	Published Hatchery Goals	5	10	8	12	8	0	7	a82
H212	Major Production Limiting Factors	3	10	12	8	9	4	9	1.08
H213	Annual Hatchery Budgets	10	5	8	14	5	0	7	a70
H299	Other	0	0	1	0	1	0	1	1.50
H299	Other	0	0	0	0	0	0	0	0.00
H300	***REARING INFORMATION***	0	1	1	0	2	0	1	
H301	Feeding History (diet)	5	II	10	16	6	0	I?	a60
H302	Growth Rate	3	14	6	16	4	1	II	0.81
H303	Rearing Density	1	11	14	17	5	0	IO	a90
H304	Rearing Water Temperature	2	15	9	16	4	0	11	0.81
H305	Number of Ponds Used in Rearing / Types	8	12	5	15	5	0	10	0.68
H306	Condition Factor	5	10	9	10	9	1	7	0.66
H307	Disease History (Inoculations/Treatments)	1	11	14	14	7	0	11	0.94
H308	Transfer History & Methods	2	12	10	15	5	0	10	0.85
H309	Days Reared	7	7	8	17	1	0	9	0.69
H399	Other	0	0	0	0	0	0	0	0.00
H399	Other	0	0	0	0	0	0	0	0.00
H400	"RELEASE INFORMATION"	0	1	6	5	1	0	2	
H401	Total Number Released	2	5	23	17	7	0	14	1.00
H402	Counting/Estimation Method (# Released)	1	8	16	13	9	0	11	1.00
H403	Release Location	4	6	10	21	4	0	14	a96
H404	Release Location Coded	2	6	10	20	4	5	10	0.91
H405	Release Date(s)							14	a93
H406	R - Information Coded by Brood Year	3	6	12	12	5	I	9	a93
H407	R - Residualism Data	7	6	10	1	IO	8		1.31
H408	Release Purpose	1	8	14	9	10	1	5	1.07
H419	Physiological Status @ Rd (e.g. ATPase)	5	II	9	4	13	4	5	1.08
H410	Size @ Release	2	3	23	IS	6	0	14	1.00
H411	Stage or Class (e.g. fry, smolt, yearling)	0	6	21	19	5	0	16	1.00
H412	Type (e.g. production, experimental, index)	2	7	17	14	8	0	13	0.96
H413	Release Transition	1	11	9	7	9	2	5	1.05
H414	Outmigration Timing	5	8	13	5	17	0	6	1.04
H415	Riverine Water Conditions After Release	6	13	6	5	11	4	5	a98
H416	Riverine Habitat Inventory	8	11	3	1	13	4	1	a97
H417	CWT Marking Data	1	6	20	19	4	0	9	a96
H418	PIT Tagging Data	4	5	12	10	5	0	4	0.89
H419	Fin Clip Data	2	4	19	15	6	0	6	0.99
H420	Chemical Marking Data	1	8	10					a99
H421	Natural Missing Adipose Fin Percentage	5	9	8	7	8	2	3	0.91
H422	Lot Number	5	10	6	14	4	0	9	0.74
H499	Other	0	1	0	0	1	0	0	1.00
H499	Other	0	0	0	0	0	0	0	0.00
H500	"SURVIVAL RATES"	1	1	6	4	5	0	3	
H501	Prespawning Prehatchery Survival Rate	5	9	10	3	13	4	3	I 13
H502	Prespawning @ Hatchery Survival Rate	5	10	11	12	9	1	I	0.89
H503	Egg to Fry Survival Rate	5	12	9	16	6	0	11	0.79
H504	Fry to Smolt Survival Rate	5	12	10	16	7	0	12	0.81
H505	Smolt Outmigration Survival Rate	4	9	15	4	11	8	3	1.31
H506	Smolt to Adult Survival Rate	.	7	18	7	13	5	6	1.19
H507	Escapement to Smolt Survival Rate	4	8	11	2	12	5	1	1.25
H599	Other	0	0	1	0	0	0	0	0.00
H599	Other	0	0	0	0	0	0	0	0.00

*** POLICY VIEW ---

CISSURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
A)vailable (I)nadequate (M)issin
Total Number of Surveys Returned 24

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL.	
		H	I	C	A	I	M	Y	GAP
H100	● *Escapement and SPAWNERS***	3	3	2	3	4	0	2	
H101	Facility Where Spawning Occurs	2	3	3	5	3	0	2	0.81
H102	Sex Ratio of Returning Adults	2	4	1	3	[illegible]	[illegible]	[illegible]	0.65
H103	Sex Ratio of Spawners Used	2	4	[illegible]	5	3	0	2	0.12
H104	Escapement Estimate (total run-all stocks)	2	3	5		5	0	1	0.92
H105	Broodstock Total Return Estimate (to F.W.)	2	3	4	3	6	0	1	0.95
H106	Broodstock Age Structure	2	3	2	5	2	0	1	0.74
H107	Broodstock Fecundity	2	4	1	5	2	0	1	0.68
H108	Broodstock Selection Methods	2	1	4	1	5	1	1	1.14
H109	Broodstock Health Conditions	2	1	4	2	5	0	1	1.00
H110	Hatchery/Wild Ratio Returned to Hatchery	2	3	2	3	4	0	1	0.82
H111	Broodstock Inclusion Ratio of Wild Fish	2	3	2	3	4	0	1	0.82
H112	Broodstock Collection Type	3	2	1	4	2	0	1	0.70
H113	Date(s) Broodstock Returned to Hatchery	3	2	2	3	3	0	1	0.74
H114	Dates of Spawning	3	2	2	4	3	0	1	a74
H115	Length Frequency of Spawners by Sex	3	2	2	5	2	0	1	0.70
H117	Weight of Spawners	2	4	0		1	0	1	a s 9
H118	Stock of Origin	3	2	3	4	4	0	1	a m
H119	Electrophoretic Profile of Stock	1	3	2	3	2	0	0	a s 3
H120	Repeat Spawning Percentage for Steelhead	4	2	0	4	1	0	1	0.48
H121	Broodstock Mark Return Count	4	1	2	3	3	0	1	0.69
H122	Scale Age vs. Mark Age Correction Factor	4	1	1	3	2	0	0	0.58
HI23	Hatchery sport harvest	2	3	3	5	3	0	1	0.81
H124	Hatchery tribal harvest	2	3	3	5	3	0	0	0.81
H199	Other	0	0	0	0	0	0	0	0.00
H199	Other	0	0	0	0	0	0	0	0.00
H200	●[illegible] INFORMATION***	0	0	2	1	2	0	2	
H201	Hatchery/Facility Where Eggs Hatched	2	3	1	4	2	0	2	0.69
H202	Hatchery/Facility Fish Last Reared	2	3	1	4	2	a	2	0.69
H203	Facilities where Fish Previously Reared	2	3	1	4	2	0	2	a69
H204	Hatchery Number(s) or Code(s)	2	2	2	5	1	0	1	0.71
H205	Source of Water @ Hatchery	2	2	2	5	1	0	2	0.71
H206	Hatchery Water Quantity	1	3	2	4	2	0	2	0.61
H207	Hatchery Water Quality	3	2	2	4	2	0	2	0.70
H208	Hatchery Effluent Quality	4	3	0	4	2	0	2	0.54
H209	Hatchery Capacity	2	4	1	5	1	0	2	a66
H210	Hatchery Methods/Procedures	3	2	2	4	2	0	1	a70
H211	Published Hatchery Goals	4	4	1	6	2	0	1	0.61
H212	Major Production Limiting Factors	3	4	2	4	4	0	1	a76
H213	Annual Hatchery Budgets	4	3	1	5	2	0	1	0.60
H299	Other	0	0	0	0	0	0	0	0.00
H299	Other	0	0	0	0	0	0	0	0.00
H300	***REARING INFORMATION***	1	0	0	0	0	0	0	
H301	Feeding History (diet)	5	1	1	4	2	0	1	0.54
H302	Growth Rate	4	2	1	5	1	0	1	0.55
H303	Rearing Density	3	1	3	4	2	0	2	a n
H304	Rearing Water Temperature	3	2	2	5	1	0	1	a66
H305	Number of Ponds Used in Rearing / Types	4	1	2	5	1	0	1	0.61
H306	Condition Factor	4	2	1	5	1	0	1	0.55
H307	Disease History (Inoculations/Treatments)	3	1	3	4	2	0	2	a n
H308	Transfer History & Methods	4	2	2	6	1	0	2	0.61
H309	Days Reared	5	1	1	5	1	0	1	0.50
H399	Other	0	0	0	0	0	0	0	0.00
H399	Other	0	0	0	0	0	0	0	0.00
H400	***RELEASE INFORMATION***	0	0	2	0	2	0	1	
H401	Total Number Released	2	4	3	7	2	0	2	0.76
H402	Counting/Estimation Method (# Released)	2	3	[illegible]	4	3	0	2	a78
H403	Release Location	1	4	4	6	3	0	2	0.68
H404	Release Location Coded	1	5	2	5	2	1	1	0.65
H405	Release Date(s)	1	4	3	6	2	0	2	0.82
H406	Release Information Coded by Brood Year	2	3	2	5	1	0	2	0.71
H407	Release Residualism Data	2	3	2	2	5	0	0	0.88
H408	Release Purpose	3	3	2	3	5	0	2	0.79
H419	Physiological Status @ Rel. (e.g. ATPase)	4	2	2	3	5	0	2	0.74
H410	Size @ Release	3	1	4	5	3	0	2	0.81
H411	Stage or Class (e.g. fry, smolt, yearling)	2	3	3	4	4	0	2	0.85
H412	Type (e.g. production, experimental, index)	2	3	2	4	3	0	2	0.X
H413	Release Transition	2	1	3	2	3	1	1	1.00
H414	Outmigration Timing	2	2	3	2	5	1	1	1.01
H415	Riverine Water Conditions After Release	4	2	1	2	4	1	0	a73
H416	Riverine Habitat Inventory	3	3	1	4	3	0	0	0.67
H417	CWT Marking Data	3	3	2	7	1	0	1	0.65
H418	PIT Tagging Data	3	3	2	6	2	0	a	0.68
H419	Fin Clip Data	2	1	3	5	1	0	0	0.76
H420	Chemical Marking Data	3	2	1	4	2	0	0	0.63
H421	Natural Missing Adipose Fin Percentage	2	2	1	2	3	1	0	0.63
H422	Lot Number	3	3	0	4	2	0	2	0 56
H499	Other	0	0	0	0	0	0	0	000
H499	Other	0	0	0	0	0	0	0	0 00
H500	***SURVIVAL RATES***	1	0	2	1	2	0	1	
H501	Prespawning Prehatchery Survival Rate	2	3	2	3	3	0	1	a m
H502	Prespawning @ Hatchery Survival Rate	3	1	3	4	2	0	1	0.75
H503	Egg to Fry Survival Rate	2	3	2	5	1	0	1	0.71
H504	Fry to Smolt Survival Rate	2	3	2	5	1	0	1	0.71
H505	Smolt Outmigration Survival Rate	2	3	4	1	7	0	0	1.05
H506	Smolt to Adult Survival Rate	1	3	5	1	5	0	0	1.16
H507	Escapement to Smolt Survival Rate	2	3	3	2	3	2	0	1.06
H599	Other	0	0	0	0	0	0	0	0 00
HJW	Other	0	0	0	0	0	0	0	0.00

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned m

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL.	
		N			A				
		H	I	C	A	I	M	Y	
H100	***ESCAPEMENT and SPAWNERS***	4	9	25	16	9	0	12	GAP
H101	Facility Where Spawning Occurs	6	18	17	30	7	0	20	0.81
ii 102	Sex Ratio of Returning Adults	1 1 2 0 8			27	7	0	17	a69
H103	Sex Ratio of Spawners Used	9	16	11	23	9	0	18	a76
H104	Escapement Estimate (total run-all stocks)	4	10	27	20	I4	2	I2	1.02
H105	Broodstock Total Return Estimate (to F.W.)	2	16	20	19	14	1	II	a93
H106	Broodstock Age Structure	5	23	12	23	13	0	11	0.82
ii 107	Broodstock Fecundity	9	18	a	22	10	1	IS	a n
H108	Broodstock Selection Methods	5	13	19	19	15	1	13	0.95
H109	Broodstock Health Conditions	3	16	16	I9	14	0	13	a92
H110	Hatchery/Wild Ratio Returned to Hatchery	6	I4	w	14	19	5	11	Los
Hi11	Broodstock Inclusion Ratio of Wild Fish	7	10	20	11	17	5	6	1.08
H112	Broodstock Collection Type	8	12	I2	19	6	1	11	0.80
H113	Date(s) Broodstock Returned to Hatchery	8	18	14	28	a	0	16	a n
H114	Dates of Spawning	6	17	14	31	5	0	17	a n
H115	Length Frequency of Spawners by Sex	14	17	7	23	11	1	11	469
ii117	Weight of Spawners	18	7	I	lo	9	8	6	0.65
H118	Stock of Origin	3	16	73	19	13	3	12	1.01
H119	Electrophoretic Profile of Stock	8	12	6	4	12	9	3	LO7
H120	Repeat Spawning Percentage for Steelhead	15	7	2	8	6	a	4	a n
H121	Broodstock Mark Return Count	4	13	20	24	9	0	13	0.89
H122	Scale Age vs. Mark Age Correction Factor	13	15	6	6	18	7	5	0.91
HI23	Hatchery sport harvest	7	13	22	21	11	3	8	0.94
H124	Hatchery tribal harvest	8	8	22	11	16	5	5	1.08
H199	Other	0	3	2	1	2	0	1	L03
H199	Other	0	0	2	0	1	0	1	1.50
H200	***HATCHERY INFORMATION***	3	1	3	5	1	0	2	
H201	Hatchery/Facility Where Eggs Hatched	6	14	15	28	4	0	18	a73
H202	Hatchery/Facility Fish Last Reared	5	17	15	28	4	0	18	a m
H203	Facilities where Fish Previously Reared	6	17	12	28	4	0	16	0.76
H204	Hatchery Number(s) or Code(s)	9	14	8	27	2	0	13	a67
H205	Source of Water @ Hatchery	7	17	11	36	4	1	17	a n
H206	Hatchery Water Quantity	8	18	9	23	8	0	15	a74
H207	Hatchery Water Quality	8	13	13	I9	9	2	12	0.84
H208	Hatchery Effluent Quality	9	16	5	16	10	1	13	a n
H209	Hatchery Capacity	4	18	12	27	3	0	15	a n
H210	Hatchery Methods/Procedures	6	9	18	17	a	3	14	0.95
H211	Published Hatchery Goals	8	15	13	20	11	0	10	0.81
ii212	Major Production Limiting Factors	5	14	15	14	9	5	11	a99
H213	Annual Hatchery Budgets	15	6	10	21	5	0	9	0.65
H299	Other	0	0	2	1	1	0	2	1.20
H299	Other	0	0	1	0	0	1	1	3.00
HMO	"REARING INFORMATION***	2	2	0	1	1	0	0	
H301	Feeding History (diet)	10	13	11	25	5	0	13	a72
H302	Growth Rate	9	16	8	24	4	1	12	0.71
H303	Rearing Density	3	16	16	23	8	0	12	0.86
H304	Rearing Water Temperature	5	20	10	26	5	0	13	a n
H305	Number of Ponds Used in Rearing / Types	12	14	6	22	5	0	11	0.64
H306	Condition Factor	10	13	10	17	11	1	9	0.78
H307	Disease History (Inoculations/Treatments)	4	14	19	22	9	0	13	0.89
H308	Transfer History & Methods	5	19	11	23	7	0	14	0.78
H309	Days Reared	11	12	6	23	2	0	11	a63
H399	Other	0	0	1	1	0	0	1	L00
H399	Other	0	0	0	0	0	0	0	0.00
H400	***RELEASE INFORMATION***	1	2	6	5	2	0	2	
H401	Tool Number Released	3	7	35	30	8	0	19	a97
H402	Counting/Estimation Method (# Released)	4	16	14	21	8	2	12	0.88
H403	Release Location	3	9	29	34	3	0	17	0.90
H404	Release Location Coded	7	11	12	19	5	2	12	0.82
H405	Release Date(s)	2	13	26	34	1	0	18	as7
H406	Release Information coded by Brood Year	6	10	17	24	5	1	11	0.84
H407	Release Residualism Data	10	12	11	2	16	11	1	1.20
H408	Release Purpose	1	14	18	16	12	2	7	1.02
H419	Physiological Status @ Rd. (e.g. ATPase)	9	19	9	6	19	6	7	0.97
ii416	Size @ Release	3	10	28	29	7	0	16	a93
H411	Stage or Class (e.g. fry, smolt, yearling)	2	11	28	29	6	1	17	0.95
H412	Type (e.g.production, experimental, index)	6	13	20	21	11	1	15	0.91
H413	Release Transition	5	12	11	8	12	4	5	1.02
H414	Outmigration Timing	9	10	17	9 2 2		0	8	a.97
H415	Riverine Water Conditions After Release	13	16	8	9	16	5	3	0.87
H416	Riverine Habitat Inventory	14	14	2	5	13	5	0	0.80
ii417	CWT Marking Data	4	13	24	31	5	0	10	0.87
H418	PIT Tagging Data	8	9	15	20	6	0	4	0.80
H419	Fin Clip Data	2	10	24	24	7	0	5	0.94
H420	Chemical Marking Data	6	12	9	11	10	1	3	0.86
H421	Natural M-g Adipose Fin Percentage	12	12	5	9	12	5	2	0.82
H422	Lot Number	8	14	6	20	4	0	11	0.68
H499	Other	0	2	2	2	2	0	1	1.00
H499	Other	0	1	1	2	0	0	1	0.83
H500	"SURVIVAL RATES***	2	1	6	3	5	0	2	
H501	Prespawning Prehatchery Survival Rate	8	16	13	7	18	6	4	1.05
H502	Prespawning @ Hatchery Survival Rate	10	16	14	22	11	1	8	0.80
H503	Egg to Fry Survival Rate	6	19	11	25	5	0	13	0.75
H504	Fry to Smolt Survival Rate	6	19	11	25	5	0	13	0 75
H505	Smolt Outmigration Survival Rate	.	11	24	7	17	9	5	1 30
,H506	Smolt to Adult Survival Rate	3	11	27	6 2 3		6	7	126
H507	Escapement to Smolt Survival Rate	6	14	14	5	15	8	3	1 18
H599	Other	0	0	2	0	1	0	0	1 50
H599	Other	0	1	0	0	1	0	0	1 00

Appendix Table D-7. WA/OR/ID SUMMARY RESPONSES BY FEDERAL AGENCIES Mar-92

CISSURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned 29

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS N H	NEEDS N I	NEEDS N C	AVAILABILITY A A	AVAILABILITY A I	AVAILABILITY A M	COLL. Y	GAP
H100	***ESCAPEMENT and SPAWNERS***	3	3	6	7	5	0	2	GAP
H101	Facility Where Spawning Occurs	3	4	3	7	3	0	2	a74
H102	Sex Ratio of Returning Adults	2	a	0	8	2	0	2	0.64
H103	Sex Ratio of Spawners Used	2	7	[illegible]	6	3	0	2	a67
H104	Escapement Estimate (total run-all stocks)	2	5	4	5	6	0	2	a89
H105	Broodstock Total Return Estimate (to F.W.)	3	4	4	6	5	0	2	0.82
H106	Broodstock Age Structure	3	6	2	7	3	0	2	0.71
H107	Broodstock Fecundity	4	5	1	0	4	0	2	0.65
H108	Broodstock Selection Methods	4	4	t	3	4	1	1	a74
H109	Broodstock Health Conditions	3	4	2	4	4	1	1	0.81
H110	Hatchery/Wild Ratio Returned	5	4	2	2	7	1	1	0.82
H111	Broodstock Inclusion Ratio d Wild Fish	4	5	0	4	6	1	1	a74
H112	Broodstock Collection Type	3	5	0	3	3	0	1	0.68
H113	Date(s) Broodstock Returned to Hatchery	5	3	2		6		2	a73
H114	Dates of Spawning	5	4	1	5	4	0	2	a63
H115	Length Frequency of Spawners by Sex	7	2	0	4	4	1	2	as2
H117	Weight of Spawners	4	2	0	3	2	3	0	0.67
H118	Stock of Origin	3	5	2	5	4	1	2	0.79
H119	Electrophoretic Profile of Stock	1	7	2	0	8	2	2	1.17
H120	Repeat Spawning Percentage for Steelhead	4	2	0	3	2	2	t	0.62
H121	Broodstock Mark Return Count	2	4	3	5	4	0	2	0.83
H122	Scale Age vs. Mark Age Correction Factor	3	3	1	4	3	1	1	0.72
H123	Hatchery sport harvest	2	4	3	3	5	1	1	a93
H124	Hatchery tribal harvest	2	4	3	3	5	1	1	0.95
H199	Other	0	0	1	0	1	0	1	1.50
H199	Other	0	0	0	0	0	0	0	a m
H200	***HATCHERY INFORMATION***	0	2	3	3	2	0	0	
H201	Hatchery/Facility Where Eggs Hatched	3	4	1	5	2	0	2	0.64
H202	Hatchery/Facility Fish Last Reared	3	5	1	6	2	0	2	0.65
H203	Facilities where Fish Previously Reared	3	4	1	5	2	0	2	a64
H204	Hatchery Number(s) or Code(s)	2	3	3	5	2	0	2	0.78
H205	Source of Water @ Hatchery	3	2	3	6	1	0	2	0.70
H206	Hatchery Water Quantity	2	3	3	5	2	0	2	0.78
H207	Hatchery Water Quality	3	3	3	6	2	0	2	473
H208	Hatchery Effluent Quality	4	3	1	5	2	0	2	0.60
H209	Hatchery Capacity	1	6	2	5	3	0	2	0.80
H210	Hatchery Methods/Procedures	3	3	2	5	2	0	2	a69
H211	Published Hatchery Goals	3	6	2	5	3	0	1	a73
H212	Major Production Limiting Factors	2	5	2	5	3	0	2	476
H213	Annual Hatchery Budgets	3	4	0	6	1	0	1	0.55
H299	Other	0	0	0	0	0	0	0	0.00
H299	Other	0	0	0	0	0	0	0	0.00
H300	***REARING INFORMATION***	0	2	3	4	1	0	1	
H301	Feeding History (diet)	3	2	3	6	2	0	3	0.73
H302	Growth Rate	2	3	3	6	2	0	3	0.77
H303	Rearing Density	3	0	7	6	2	0	3	0.87
H304	Rearing Water Temperature	2	3	3	6	2	0	3	a n
H305	Number of Ponds Used in Rearing / Types	3	2	3	6	2	0	3	a n
H306	Condition Factor	4	5	1	6	2	0	2	0.62
H307	Disease History (Inoculations/Treatments)	3	2	5	6	2	0	2	0.80
H308	Transfer History & Methods	4	t	5	6	3	0	2	0.79
H309	Days Reared	3	3	2	6	2	0	2	0.68
H399	Other	0	0	0	0	0	0	0	0.00
H399	Other	0	0	0	0	0	0	0	0.00
H400	*** RELEASE INFORMATION***	0	1	5	5	1	0	1	
H401	Total Number Released	3	5	7	9	4	0	3	a.84
H402	Counting/Estimation Method (# Released)	3	4	4	7	2	0	3	0.75
H403	Release Location	2	5	8	9	4	0	4	0.89
H404	Release Location Coded	2	5	4	7	2	1	4	0.84
H405	Release Date(s)	2	7	4	8	4	0	3	0.81
H406	Release Information Coded by Brood Year	2	3	3	5	2	0	2	0.78
H407	Release Residualism Data	3	4	0	2	3	1	0	a n
H408	Release Purpose	4	5	3	7	4	0	2	0.73
H419	Physiological Status @ Rel. (e.g. ATPase)	4	1	7	4	5	1	2	0.98
H410	Size @ Release	3	3	6	6	4	1	3	0.92
H411	Stage or Class (e.g. fry, smolt, yearling)	3	6	3	6	4	0	2	0.77
14412	Type (e.g.production, experimental, index)	2	.	3	5	3	0	2	0.80
11413	Release Transition	3	5	0	5	2	0	2	0.60
H414	Outmigration Timing	2	3	6	4	5	1	t	1.03
H415	Riverine Water Conditions After Release	3	1	4	3	4	0	1	0.88
H416	Riverine Habitat Inventory	3	5	2	3	6	0	0	0.61
H417	CWT Marking Data	2	2	7	7	2	0	3	0.88
H418	PIT Tagging Data	2	3	4	5	2	0	1	0.82
H419	Fin Clip Data	3	2	2	4	2	0	1	0.70
H420	Chemical Marking Data	3	2	1	3	2	0	0	0.64
H421	Natural Missing Adipose Fin Percentage	2	1	3	3	2	0	0	0.83
H422	Lot Number	3	2	3	5	2	0	2	0.74
H499	Other	0	0'	1	0	0	1	t	3.00
H499	Other	0	0	0	0	0	0	0	0.00
H500	***SURVIVAL RATES***	1	2	4	3	3	0	1	
H501	Prespawning Prehatchery Survival Rate	2	4	4	1	6	1	1	1.10
H502	Prespawning @ Hatchery Survival Rate	2	3	5	5	3	0	2	0.88
H503	Egg to Fry Survival Rate	4	3	4	7	3	0	2	0.74
H504	Fry to Smolt Survival Rate	4	3	4	7	3	0	2	a74
H505	Smolt Outmigration Survival Rate	3	4	7	1	9	1	0	1.10
H506	Smolt to Adult Survival Rate	3	3	9	3	10	0	t	1.08
H507	Escapement to Smolt Survival Rate	2	5	2	2	6	0	0	0.89
H599	Other	0	0	0	0	0	0	0	0.00
H599	Other	0	0	0	0	0	0	0	0.00

a s SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned 9

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL.	
		H	N I	C	A	A I	M	Y	
H100	***ESCAPEMENT and SPAWNERS***	0	0	4	1/3	3	0	1	GAP
H101	Facility Where Spawning Occurs	0	2	2		1	0	1	0.91
H102	Sex Ratio of Returning Adults	0	2	2	1	3	0	1	1.11
H103	Sex Ratio of Spawners Used	0	2	2	2	1	1	1	1.11
H104	Escapement Estimate (total run-all stocks)	0	2	2	0	3	1	1	1.43
H105	Broodstock Total Return Estimate (to F.W.)	0	2	2	0	3	1	1	1.43
H106	Broodstock Age Structure	0	2	2	2	1	1	1	1.11
H 107	Broodstock Fecundity	0	3	1	2	2	0	1	0.90
H108	Broodstock Selection Methods	0	t	3	0	2	2	1	1.83
H109	Broodstock Health Conditions	0	0	4	0	3	I	1	1.71
H110	Hatchery/Wild Ratio Returned to Hatchery	0	0	4	0	3	I	1	1.71
H111	Broodstock Inclusion Ratio of Wild Fish	0	0	4	0	3	1	1	1.71
H112	Broodstock Collection Type	1	0	3	2	2	0	1	1.00
H113	Date(s) Broodstock Returned to Hatchery	0	2	2	0	4	0	1	1.25
H114	Dates d Spawning	0	2	2	0	3	1	1	1.43
H115	Length Frequency of Spawners by Sex	0	2	2	2	1	1	1	1.11
till7	Weight d Spawners	1	3	0	-2	1	t	1	0.78
H118	Stock of Origin	0	2	2	0	4	0	1	1.25
H119	Electrophoretic Profile of Stock	0	1	2	0	2	0	1	1.33
H120	Repeat Spawning Percentage for Steelhead	1	1	1	0	1	1	1	1.33
H121	Broodstock Mark Return Count	0	t	3	0	2	0	1	1.38
H122	Scale Age vs. Mark Age Correction Factor	0	2	1	0	2	0	1	L17
H123	Hatchery sport harvest	0	0	4	2	2	0	2	1.20
H124	Hatchery tribal harvest	0	0	4	2	2	0	7.	1.20
H199	Other	0	0	0	0	0	0	0	a m
H199	Other	0	0	0	0	0	0	0	0.00
H200	*"HATCHERY INFORMATION"	1	0	1	1	1	0	1	
H201	Hatchery/Facility Where Eggs Hatched	0	4	0	0	3	0	t	1.00
H202	Hatchery/Facility Fish Last Reared	0	4	0	0	3	0	1	L00
H203	Facilities where Fish Previously Reared	0	4	0	0	3	0	1	1.00
H204	Hatchery Number(s) or Code(s)	0	1	2	2	1	1	1	1.19
H205	Source of Water @ Hatchery	0	3	1	3	1	0	1	0.82
H206	Hatchery Water Quantity	1	2	1	3	1	0	1	0.73
H207	Hatchery Water Quality	0	3	0	2	1	Q	1	0.75
H208	Hatchery Effluent Quality	2	2	0	2	2	0	I	0.60
H209	Hatchery Capacity	0	3	1	2	2	0	1	0.90
H210	Hatchery Methods/Procedures	0	3	1	1	3	0	1	1.00
H211	Published Hatchery Goals	0	2	I	t	2	0	I	1.00
H212	Major Production Limiting Factors	0	3	1	0	4	0	1	1.13
H213	Annual Hatchery Budgets	3	0	1	2	2	0	1	a u)
H299	Other	0	0	0	0	0	0	0	0.00
H299	Other	0	0	0	0	0	0	0	0.00
H300	"'REARING INFORMATION***	1	Q	1	1	1	0	1	
H301	Feeding History (diet)	1	2	0	0	3	0	1	0.83
H302	Growth Rate	0	3	0	2	1	Q	1	0.75
H303	Rearing Density	0	1	3	2	2	0	1	1.10
H304	Rearing Water Temperature	0	2	1	2	1	0	1	0.88
H305	Number of Ponds Used in Rearing / Types	2	1	0	2	1	0	1	0.50
H306	Condition Factor	1	2	0	2	1	0	1	0.63
HJ07	Disease History (Inoculations/Treatments)	0	2	2	2	2	0	1	1.00
H308	Transfer H i & Methods	0	2	2	2	2	Q	1	1.00
H309	Days Reared	2	0	1	2	1	0	1	0.63
H399	Other	0	0	Q	0	0	Q	0	0.00
H399	Other	0	0	Q	0	0	0	0	0.00
H400	***RELEASE INFORMATION***	Q	1	0	0	1	0	0	
H401	Total Number Released	1	0	4	2	2	0	1	1.04
H402	Counting/Estimation Method (# Released)	1	0	3	0	4	0	1	1.25
H403	Release Location	1	0	4	3	2	0	1	1.00
H404	Release Location Coded	0	1	1	0	2	0	1	1.25
H405	Release Date(s)	0	0	4	2	2	Q	I	1.20
H406	Release Information Coded by Brood Year	0	0	2	0	1	Q	1	1.50
H407	Release Residualism Data	1	0	2	Q	3	0	1	1.17
H408	Release Purpose	0	0	4	0	3	1	1	1.71
H419	Physiological Status @ Rel. (e.g. ATPase)	0	1	3	Q	4	0	1	1.38
H410	Size @ Release	1	0	4	3	2	a	1	1.00
H411	Stage or Class (e.g. fry, smolt, yearling)	1	1	3	3	2	Q	2	a92
H412	Type (e.g. production, experimental, index)	1	1	2	2	2	0	1	0.90
H413	Release Transition	0	1	1	0	1	1	1	1.67
H414	Outmigration Timing	1	1	3	0	4	1	1	1.33
H415	Riverine Water Conditions After Release	0	3	1	0	3	1	2	L29
H416	Riverine Habitat Inventory	0	3	0	0	3	- 0	1	1.00
H417	CWT Marking Data	0	0	4	2	2	Q	1	1.20
H418	PIT Tagging Data	0	0	4	2	2	0	I	1.20
H419	Fin Clip Data	0	0	4	2	1	I	1	1.33
H420	Chemical Marking Data	0	0	3	2	1	0	1	1.13
H421	Natural Missing Adipose Fin Percentage	0	2	2	1	2	1	1	1.25
H422	La Number	1	2	0	2	1	0	1	0.0
H499	Other	Q	0	0	0	0	0	0	0.00
H499	Other	0	0	Q	0	0	0	0	0.00
H500	***SURVIVAL RATES"	0	1	0	0	2	0	1	
H501	Prespawning Prehatchery Survival Rate	0	1	2	2	0	3	0 1	1.33
H502	Prespawning @ Hatchery Survival Rate	0	1	2	1	2	0	1	1.14
H503	Egg to Fry Survival Rate	0	2	2	2	2	0	1	1.00
H504	Fry to Smolt Survival Rate	Q	2	2	1	J	0	I	1.11
H505	Smolt Outmigration Survival Rate	0	0	4	0	4	0	1	150
H506	Smolt to Adult Survival Rate	0	0	4	0	4	0	I	1.50
H507	Escapement to Smolt Survival Rate	0	1	3	0	2	2	1	1.83
H599	Other	0	0	Q	0	0	0	0	000
H599	Other	0	0	0	0	0	0	0	0.00

Appendix Table D-9. WA / OR / ID SUMMARY
OTHERS (NON-FED/STATE/TRIBAL)

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned 10

		NEEDS			AVAILABILITY			COLL.	
		N H	I	C	A	I	M	Y	
		GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))							
H100	***ESCAPEMENT and SPAWNERS***	1	2	2	3	2	0	0	GAP
H101	Facility Where Spawning Occurs	1	2	2	3	1	0	0	0.80
H102	Sex Ratio of Returning Adults	2	2	1	2	1	0	0	a68
H103	Sex Ratio of Spawners Used	1	3	0	2	1	0	0	a66
H104	Escapement Estimate (total run-all stocks)	1	4	3	2	3	0	0	a94
H105	Broodstock Total Return Estimate (to F.W.)	0	3	0	1	2	0	0	0.86
H106	Broodstock Age Structure	1	1	2	2	1	0	0	0.84
H107		1	1	2	2	1	0	1	a84
H108	Broodstock Selection Methods	1	1	1	1	1	1	0	1.00
H109	Broodstock Health Conditions	1	1	2	1	2	0	0	a96
H110	Hatchery/Wild Ratio	0	3	1	0	3	0	1	1.13
H111	Broodstock Inclusion Ratio of Wild Fish	0	3	1	0	3	0	1	113
H112	Broodstock Collection Type	0	1	1	1	1	0	0	1.00
H113	Date(s) Broodstock Returned to Hatchery	1	1	1	2	1	0	0	0.80
H114	Dates of Spawning	1	2	1		1	0	0	0.75
H115	Length Frequency of Spawners by Sex	1	3	1	3	1	0	0	a n
H117	Weight of Spawners	0	2	1	1	2	0	0	1.00
H118	Stock of Origin	0	3	2	1	1	0	0	a96
H119	Electrophoretic Profile of Stock	0	2	1	0	2	0	0	1.17
H120	Repeat Spawning Percentage for Steelhead	1	0	1	1	1	0	0	0.80
H121	Broodstock Mark Return Count	0	2	2	2	1	0	0	0.94
H122	Scale Age vs. Mark Age Correction Factor	0	1	1	0	2	0	0	1.25
H123	Hatchery sport harvest	1	2	2	2	2	0	0	0.88
H124	Hatchery tribal harvest	1	2	2	2	3	0	0	0.92
H198	Other	Q	0	0	0	0	0	0	0.00
H199	Other	0	0	0	0	0	0	0	a w
H200	***HATCHERY INFORMATION***	0	0	0	0	0	0	Q	
H201	Hatchery/Facility Where Eggs Hatched	1	1	1	1	1	0	0	0.80
H202	Hatchery/Facility Fish Last Reared	1	1	1	1	1	0	0	a80
H203	Facilities where Fish Previously Reared	0	1	1	1	1	0	0	1.00
H204	Hatchery Number(s) or Code(s)	0	1	2	2	1	0	0	1.00
H205	Source of Water @ Hatchery	0	3	0	2	1	0	0	a n
H206	Hatchery Water Quantity	0	2	0	1	1	0	Q	0.80
H207	Hatchery Water Quality	0	2	2	2	2	0	2	1.00
H208	Hatchery Effluent Quality	0	3	1	2	2	0	1	0.90
H209	Hatchery Capacity	1	1	2	2	1	0	1	a84
H210	Hatchery Methods/Procedures	0	2	2	2	2	0	2	1.00
H211	Published Hatchery Goals	1	2	1	0	3	0	0	1.00
H212	Major Production Limiting Factors	1	3	2	2	3	0	2	0.90
H213	Annual Hatchery Budgets	0	3	0	1	2	0	0	0.86
t-P.99	Other	0	0	0	0	0	0	0	0.00
H299	Other	0	0	0	0	0	0	0	0.00
H300	***REARING INFORMATION***	0	0	0	0	0	0	Q	
H301	Feeding History (diet)	0	2	2	2	1	0	2	a94
H302	Growth Rate	0	2	2	3	0	0	1	0.83
H303	Rearing Density	1	1	2	1	1	1	2	113
H304	Rearing Water Temperature	1	2	1	3	0	0	2	0.67
H305	Number of Ponds Used in Rearing / Types	0	2	1	3	0	0	2	a78
H306	Condition Factor	1	2	1	2	0	0	0	0.67
H307	Disease History (Inoculations/Treatments)	0	3	2	2	0	1	t	1.03
H308	Transfer H i & Methods	0	1	1	t	0	0	0	a83
H309	Reared	0	1	2	2	0	0	0	0.89
H399	Other	0	0	0	0	0	0	Q	0.00
H399	Other	0	0	0	0	0	Q	0	0.00
H400	***RELEASE INFORMATION***	0	1	2	1	1	0	1	
H401	Total Number Released	0	2	3	1	2	0	1	1.11
H402	Counting/Estimation Method (# Released)	0	3	2	1	2	0	1	1.03
H403	Release Location	0	3	3	2	1	0	1	0.94
H404	Release Location Coded	1	2	2	1	1	0	0	a88
H405	Release Date(s)	0	3	3	2	1	0	1	0.94
H406	Release Information Coded by Brood Year	0	2	2	1	1	0	0	1.00
H407	Release Residualism Data	1	2	2	0	2	0	0	110
H408	Release Purpose	1	1	1	1	1	0	Q	0.80
H419	Physiological Status @ Rel. (e.g. ATPase)	1	2	1	0	2	1	0	1.20
H410	Size @ Release	0	3	3	2	1	0	1	0.94
H411	Stage or Class (e.g. fry, smolt, yearling)	0	3	4	3	1	0	1	0.94
H412	Type (e.g. production, experimental, index)	1	2	3	2	1	0	1	a88
H413	Release Transition	0	1	1	0	2	0	0	1.25
H414	Outmigration Timing	1	1	1	1	1	0	0	0.80
H415	Riverine Water Conditions After Release	1	2	1	a	3	0	0	1.00
H416	Riverine Habitat Inventory	0	1	1	1	1	0	0	1.00
H417	CWT Muting Data	0	3	3	2	1	0	1	0.94
H418	PIT Tagging Data	0	3	2	1	1	0	0	a96
H419	Fin Clip Data	a	2	1	1	1	0	0	0.93
H420	Chemical Marking Data	Q	1	1	0	2	9	0	1.25
H421	Natural Missing Adipose Fin Percentage	1	2	2	0	2	0	0	110
H422	Lot Number	0	2	0	1	1	0	0	0 80
H499	Other	0	0	0	0	0	0	0	0 00
H499	Other	0	0	Q	0	0	0	0	0 00
H500	***SURVIVAL RATES***								
H501	Prespawning/Prehatchery Survival Rate	1	0	2	1	2	0	1	1.00
H502	Prespawning @ Hatchery Survival Rate	1	1	1	1	1	0	0	0.80
H503	Egg to Fry Survival Rate	1	1	1	1	1	0	0	0 80
H504	Fry to Smolt Survival Rate	1	1	2	2	1	Q	1	0.64
H505	Smolt Outmigration Survival Rate	0	2	1	0	2	0	0	1.17
H506	Smolt to Adult Survival Rate	0	3	3	1	2	0	1	1.07
H507	Escapement to Smolt Survival Rate	1	1	1	1	1	0	0	0.80
H599	Other	0	0	0	0	0	0	0	0.00
H599	Other	0	0	0	0	0	0	0	0.00

Appendix Table D-10. WASHINGTON STATE
STATEWIDE

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned

NEEDS | AVAILABILITY | COLL

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		A	I	M	Y				GAP
H100	***ESCAPEMENT and SPAWNERS***	2	7	16	12	10	0	8	GAP
H101	Facility Where Spawning Occurs	4	15	9	20	6	0	13	a79
H102	Sex Ratio of Returning Adults	7	18	3	20	5	0	13	a66
H103	Sex Ratio of Spawners Used	5	17	3	14	8	0	12	a n
H104	Escapement Estimate (total run-all stocks)	1	8	22	14	11	2	9	1.10
H105	Broodstock Total Return Estimate (to F.W.)	1	12	13	12	11	1	8	1.00
H106	Broodstock Age Structure	2	17	6	16	8	0	9	0.83
H107	Broodstock Fecundity	6	14	4	15	8	1	11	a74
H108	Broodstock Selection Methods	1	12	10	13	9	0	9	a92
H109	Broodstock Health Conditions	2	11	10	13	10	0	9	a92
H110	Hatchery/Wild Ratio Returned to Hatchery	4	12	9	7	15	3	6	1.02
H111	Broodstock Inclusion Ratio of Wild Fish	6	10	9	7	13	2	3	0.95
H112	Broodstock Collection Type	8	10	5	12	7	1	7	a n
H113	Date(s) Broodstock Returned to Hatchery	5	15	8	15	10	0	11	0.81
H114	Dates of Spawning	6	12	9	18	7	0	12	a m
H115	Length Frequency of Spawners by Sex	12	11	4	14	10	1	8	a68
H117	Weight of Spawners	11	7	1	6	6	7	3	0.76
H118	Stock of Origin	1	14	14	14	10	0	9	0.95
H119	Electrophoretic Profile of Stock	4	14	3	3	11	6	1	1.06
H120	Repeat Spawning Percentage for Steelhead	9	5	2	7	3	4	2	0.71
H121	Broodstock Mark Return Count	4	11	10	15	a	0	9	a84
H122	Scale Age vs. Mark Age Correction Factor	9	11	3	6	12	3	4	0.81
H123	Hatchery sport harvest	3	10	15	12	10	2	6	1.00
H124	Hatchery tribal harvest	3	8	15	9	11	3	4	1.09
H199	Other	0	1	2	0	2	0	1	133
H199	Other	0	0	0	0	0	0	0	0.00
H200	***HATCHERY INFORMATION***	1	2	4	5	1	0	1	
H201	Hatchery/Facility Where Eggs Hatched	5	14	5	18	4	0	11	0.71
H202	Hatchery/Facility Fish Last Reared	4	17	6	19	4	0	11	a n
H203	Facilities where Fish Previously Reared	6	15	4	18	4	0	11	0.68
H204	Hatchery Number(s) or Code(s)	6	12	6	20	2	0	11	a69
H205	Source of Water @ Hatchery	4	13	7	16	4	1	12	0.78
H206	Hatchery Water Quantity	4	13	6	13	7	0	11	a79
H207	Hatchery Water Quality	6	9	8	13	6	1	9	0.80
H208	Hatchery Effluent Quality	5	15	2	13	6	1	10	0.72
H209	Hatchery Capacity	4	11	10	16	3	0	11	a78
H210	Hatchery Methods/Procedures	5	10	9	13	5	2	10	0.85
H211	Published Hatchery Goals	5	16	7	12	10	0	5	0.81
H212	Major Production Limiting Factors	3	13	9	11	5	4	7	a95
H213	Annual Hatchery Budgets	8	8	4	13	5	0	6	a66
H299	Other	0	0	0	0	0	0	0	0.00
H299	Other	0	0	0	0	0	0	0	0.00
H300	***REARING INFORMATION***	1	2	2	3	1	0	1	
H301	Feeding H i (diet)	9	10	6	19	3	0	12	a66
H302	Growth Rate	7	11	6	17	3	1	11	0.71
H303	Rearing Density	4	11	11	17	5	0	11	0.82
H304	Rearing Water Temperature	5	12	6	19	3	0	12	0.74
H305	Number of Ponds Used in Rearing / Types	9	10	5	16	4	0	10	0.65
H306	Condition Factor	0	10	6	13	6	1	8	a74
H307	Disease History (Inoculations/Treatments)	4	11	11	16	5	0	11	0.82
H308	Transfer History & Methods	5	14	7	17	4	0	11	a74
H309	Days Reared	7	9	6	15	1	0	10	a66
H399	Other	0	0	0	0	0	0	0	0.00
H399	Other	0	0	0	0	0	0	0	0.00
H400	***RELEASE INFORMATION***	0	1	9	7	3	0	4	
H401	Total Number Released	1	7	24	16	6	0	12	1.01
H402	Counting/Estimation Method (# Released)	3	13	10	15	7	2	10	0.89
H403	Release Location	2	9	20	23	4	0	11	0.90
H404	Release Location Coded	5	10	8	16	2	2	8	a79
H405	Release Date(s)	1	13	16	22	3	0	11	ag7
H406	Release Information Coded by Brood Year	4	7	13	16	2	1	7	0.85
H407	Release Residualism Data	9	9	6	2	9	11	0	1.23
H408	Release Purpose	0	14	8	12	6	2	3	0.95
H419	Physiological Status @ Rd (e.g. ATPase)	7	13	9	9	11	6	6	0.98
H410	Size @ Release	2	10	21	20	7	1	12	0.96
H411	Stage or Class (e.g. fry, smolt, yearling)	1	11	17	18	5	1	11	a94
H412	Type (e.g.production, experimental, index)	5	11	12	14	7	1	10	a87
H413	Release Transition	4	11	7	5	10	.	3	1.04
H414	Outmigration Timing	5	8	10	6	13	1	5	a w
H415	Riverine Water Conditions After Release	9	10	5	6	8	5	4	0.89
H416	Riverine Habitat Inventory	7	10	3	5	6	5	0	0.90
H417	CWT Marking Data	2	10	19	24	2	0	9	a87
H418	PIT Tagging Data	5	7	9	12	4	0	0	0.80
H419	Fin Clip Data	1	9	13	13	6	0	1	0.94
H420	Chemical Marking Data	5	7	7	6	b	1	1	0.90
H421	Natural Missing Adipose Fin Percentage	7	7	6	7	8	3	1	0.88
H422	Lot Number	5	11	3	14	3	0	8	0.67
H499	Other	0	2	2	1	2	1	1	1.25
H499	Other	0	1	0	1	0	0	0	0.67
H500	***SURVIVAL RATES***	0	2	8	4	5	0	3	
H501	Prespawning Prehatchery Survival Rate	5	12	7	5	11	4	2	1.02
H502	Prespawning @ Hatchery Survival Rate	6	11	9	14	7	1	6	0.82
H503	Egg to Fry Survival Rate	3	14	7	16	4	0	8	o n
H504	Fry to Smolt Survival Rate	3	14	8	17	6	0	9	0.78
H505	Smolt Outmigration Survival Rate	1	7	17	3	12	6	0	1.42
H506	Smolt to Adult Survival Rate	o	9	20	4	16	4	3	1.34
H507	Escapement to Smolt Survival Rate	2	10	8	3	6	5	0	1.23
H599	Other	0	0	1	0	0	0	0	0.00
H599	Other	0	0	0	0	0	0	0	0.00

*** STATE WIDE ***

CISSURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing
Total Number of Surveys Returned 40

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL.	
		H	N I	C	A	A I	M	Y	
H100	***ESCAPEMENT and SPAWNERS***	4	2	8	6	4	0	4	GAP
H101	Facility Where Spawning Occurs	3	4	4	7	3	0	4	a n
H102	Sex Ratio of Returning Adults	2	5	2	7	1	0	2	a m
H103	Sex Ratio of Spawners Used	2	4	3	6	2	0	4	a n
H104	Escapement Estimate (total run-all stocks)	3	7	4	5	1	0	2	0.86
H105	Broodstock Total Return Estimate (to F.W.)	2	5	5	6	5	0	2	0.88
H106	Broodstock Age Structure	3	6	2'	6	4	0	2	a n
H107	Broodstock Fecundity	2	5	3	7	2	0	3	0.76
H108	Broodstock Selection Methods	4							0.80
H109	Broodstock Health Conditions	3	3 4	4 3	6	3	1	33	a m
H110	Hatchery/Wild Ratio Returned to Hatchery	4	4	4	3	3	2	2	0.87
H111	Broodstock Inclusion Ratio of Wild Fish	3	4	4	5	4	2	3	0.95
H112	Broodstock Collection Type	2	4	3		2	1	2	a84
H113	Date(s) Broodstock Returned to Hatchery	4	3	3	6	3	0	2	a n
H114	Dates of Spawning	3	4	3	7	2	0	3	a n
H115	Length Frequency of Spawners by Sex	4	2	1	4	3	0	2	0.61
H117	Weight of Spawners	6	1	0	5	4	0	2	a45
H118	Stock of Origin	3	6	4	6	3	2	2	0.88
H119	Electrophoretic Profile of Stock	2	3	2	0	7	1	1	L07
H120	Repeat Spawning Percentage for Steelhead	5	2	1	4	3	1	2	a63
H121	Broodstock Mark Return Count	2	4	4	6	3	0	2	0.83
H122	Scale Age vs. Mark Age Correction Factor	4	3	0	4	4	0	1	0.57
H123	Hatchery sport harvest	3	6	3	5	6	0	2	0.81
H124	Hatchery tribal harvest	3	4	3	3	6	0	1	0.86
H199	Other	0	1	1	1	0	0	0	0.83
H199	Other	0	0	1	0	0	0	0	0.00
H200	***HATCHERY INFORMATION***	2	0	2	2	2	0	1	
H201	Hatchery/Facility Where Eggs Hatched	2	4	3	6	2	0	4	a n
H202		2	4	3	6	2	0	4	a n
H203	Facilities where Fish Previously Reared	2	4	3	6	2	0	3	a n
H204	Hatchery Number(s) or Code(s)	2	4	3	6	2	0	2	a n
H205	Source of Water @ Hatchery	2	4	4	8	1	0	3	a76
H206	Hatchery Water Quantity	3	4	3	6	3	0	3	a75
H207	Hatchery Water Quality	3	4	4	7	3	0	3	a n
H208	Hatchery Effluent Quality	5	2	1	5	2	0	3	0.55
H209	Hatchery Capacity	1	6	2	7	2	0	3	a76
H210	Hatchery Methods/Procedures	3	2	4	6	2	0	3	a n
H211	Published Hatchery Goals	4	4	4	7	3	0	3	a74
H212	Major Production Limiting Factors	3	6	2	7	3	0	3	0.71
H213	Annual Hatchery Budgets	6	2	2	7	2	0	3	as8
H299	Other	0	0	0	0	0	0	0	0.00
H299	Other	0	0	0	0	0	0	0	0.00
H300	***REARING INFORMATION***	2	1	1	2	1	0	0	
H301	Feeding History (diet)	4	2	3	6	2	0	3	a69
H302	Growth Rate	4	2	3	6	2	0	3	a69
H303	Rearing Density	2	1	7	6	2	0	3	0.91
H304	Rearing Water Temperature	2	5	2	6	2	0	3	0.73
H305	Number of Ponds Used in Rearing / Types	5	2	2	6	2	0	3	0.61
H306	Condition Factor	4	4	2	5	3	0	2	0.69
H307	Disease History (Inoculations/Treatments)	3	1	6	6	2	0	2	0.84
H308	Transfer History & Methods	4	1	5	7	2	0	3	0.76
H309	Days Reared	3	3	3	6	2	0	3	a n
H399	Other	0	0	0	0	0	0	0	0.00
H399	Other	0	0	0	0	0	0	0	a00
H400	***RELEASE INFORMATION***	1	2	3	2	2	0	0	
H401	Total Number Released	2	3	9	10	2	0	5	0.88
H402	Counting/Estimation Method (# Released)	2	5	4	6	2	0	4	0.79
H403	Release Location	1	5	9	9	3	0	6	0.92
H404	Release Location Coded	1	6	4	6	2	1	5	0.89
H405	Release Date(s)	1	6	5	6	2	0	5	0.83
H406	Release Information Coded by Brood Year	1	5	3	5	2	0	3	0.82
H407	Release Residualism Data	2	5	2	1	5	1	1	1.00
H408	Release Purpose	3	2	4	5	3	0	3	0.80
H419	Physiological Status @ Rel. (e.g. ATPase)	5	3	2	1	7	0	2	0.80
H410	Size @ Release	3	3	6	7	3	0	4	0.83
H411	Stage or Class (e.g. fry, smolt, yearling)	2	4	6	6	3	0	5	0.88
H412	Type (e.g. production, experimental, index)	2	3	5	6	2	0	4	0.84
H413	Release Transition	3	2	1	2	3	0	1	0.69
H414	Outmigration Timing	2	2	6	a	5	0	1	0.98
H415	Riverine Water Conditions After Release	3	4	1	3	4	0	0	0.72
H416	Riverine Habitat Inventory	5	3	1	2	5	0	0	0.68
H417	CWT Marking Data	2	3	8	6	2	0	3	0.88
H418	PIT Tagging Data	3	3	.	4				0.82
H419	Fin Clip Data	3	0	7	7	3 2	0	03	0.86
H420	Chemical Marking Data	3	2	2	3	3	0	0	a74
H421	Natural Missing Adipose Fin Percentage	4	2	3	3	3	1	0	0.63
H422	Lot Number	3	1	4	5	2	0	2	0.78
H499	Other	0	0	0	0	0	0	0	0.00
H499	Other	0	0	0	0	0	0	0	0.00
H500	***SURVIVAL RATES***	2	1	3	3	2	0	1	
H501	Prespawning Prehatchery Survival Rate	1	5	4	2	5	1	0	1.08
H502	Prespawning @ Hatchery Survival Rate	1	6		4	6	3	0 1	0.85
H503	Egg to Fry Survival Rate	1	5	3	6	2	0	3	081
H504	Fry to Smolt Survival Rate	1	5	3	6	2	0	3	081
H505	Smolt Outmigration Survival Rate	2	6	5	2	7	2	1	1.12
H506	Smolt to Adult Survival Rate	2	4		6	4	7	0 2	1.03
H507	Escapement to Smolt Survival Rate	2	5	3	2	7	0	1	0 95
H599	Other	0	0	0	0	0	0	0	0.00
H599	Other	0	0	0	0	0	0	0	0.00

CIS SURVEY
HATCHERY RESULTS
(H)elpful (I)mportant (C)ritical
(A)vailable (I)nadequate (M)issing

Total Number of Surveys Returned: 28

GAP = ((NH+(NI*2)+(NC*3))/(NH+NI+NC)) / (((AA*3)+(AI*2)+AM)/(AA+AI+AM))

		NEEDS			AVAILABILITY			COLL.	
		H	I	C	A	I	M	Y	
H100	***ESCAPEMENT and SPAWNERS***	2	5	11	9	5	0	3	GAP
H101	Facility Where Spawning Occurs	3	7	11	16	3	0	6	0.84
H102	Sex Ratio of Returning Adults	6	9	6	11	7	0	5	a n
H103	Sex Ratio of Spawners Used	5	7	7	13	4	1	5	a 7 9
H104	[illegible] Estimate (total run-all stocks)	3	6	IO	a	8	1	4	a 9 8
H105	Broodstock Total Return Estimate (to F.W.)	2	8	a	8	8	1	4	a97
H106	Broodstock Age Structure	4	9	a	12	6	1	3	0.85
H107	Broodstock Fecundity	6	8	5	14	7	0	5	0.75
H108	Broodstock Selection Methods	5	4	10	5	10	4	3	1.13
H109	Broodstock Health Conditions	2	6	11		11	1	3	1.11
H110	Hatchery/Wild Ratio Returned to Hatchery	3	5	14	4	14	2	6	1.19
H111	Broodstock Inclusion Ratio of Wild Fish	2	4	12	2	12	3	J	L32
H112	Broodstock Collection Type	2	4	8	9	5	0	4	0.92
H113	Date(s) Broodstock Returned	5	6	a	11	6	0	6	0.82
H114	Dates of Spawning	5	9	6	13	4	1	5	an
H115	Length Frequency of Spawners by Sex	6	11	5	14	4	2	4	0.75
H117	Weight of Spawners	6	6	1	5	4	5	2	0.81
H118	Stock of Origin	2	6	11	5	9	2	4	1.13
H119	Electrophoretic Profile of Stock	3	5	6	1	6	4	4	1.28
H120	Repeat Spawning Percentage for Steelhead	7	3	1	1	4	6	2	0.94
H121	Broodstock Mark Return Count	0	5	14	10	5	0	5	LO3
H122	Scale Age vs. Mark Age Correction Factor	3	7	6	0	9	5	2	1.33
H123	Hatchery sport harvest	4	3	13	11	4	2	3	a 9 7
H124	Hatchery tribal harvest	5	2	13	6	9	3	3	1.11
H199	Other	0	1	0	0	1	0	1	LOO
H199	Other	0	0	1	0	1	0	1	1.50
H200	"HATCHERY INFORMATION***	1	1	1	2	1	0	1	
H201	Hatchery/Facility Where Eggs Hatched	3	5	9	10	4	0	6	0.87
H202	Hatchery/Facility Fish Last Reared	3	6	a	10	4	0	6	0.85
H203	Facilities where Fish Previously Reared	1	7	7	10	4	0	5	0.88
H204	Hatchery Number(s) or Code(s)	3	3	6	10	2	1	3	0.84
H205	Source of Water @ Hatchery	4	8	4	13	2	0	5	0.70
H206	Hatchery Water Quantity	4	8	4	13	2	0	4	a m
H207	Hatchery Water Quality	2	a	6	9	5	i	5	0.64
H208	Hatchery Effluent Quality	5	7	4	7	8	0	4	0.79
H209	Hatchery Capacity	1	11	5	11	4	0	5	0.82
H210	Hatchery Methods/Procedures	1	5	10	6	8	1	6	1.10
H211	Published Hatchery Goals	3	5	6	7	6	0	4	0.87
H212	Major Production Limiting Factors	2	6	9	3	11	1	6	1.13
H213	Annual Hatchery Budgets	7	3	5	10	3	6	2	0.67
H299	Other	0	0	2	1	1	0	2	1.20
H299	Other	0	0	1	0	0	1	1	3.00
H300	--- REARING INFORMATION***	0	1	1	1	1	0	1	
H301	Feeding History (diet)	1	7	7	8	6	0	4	0.93
H302	Growth Rate	0	11	4	12	2	0	3	a79
H303	Rearing Density	1	6	10	9	6	1	4	1.01
H304	Rearing Water Temperature	1	10	5	12	3	0	4	0.80
H305	Number of Ponds Used in Rearing / Types	3	7	3	112		0	4	a70
H306	Condition Factor	4	8	4	9	5	0	2	a76
H307	Disease History (Inoculations/Treatments)	0	9	11	10	6	1	4	1.01
H308	Transfer History & Methods	0	8	7	8	6	0	3	0.96
H309	Days Reared	6	4	2	9	2	6	1	0.59
H399	Other	0	0	1	1	0	0	1	1.00
H399	Other	0	0	0	0	0	0	0	0.00
H400	***RELEASE INFORMATION"	0	2	1	2	0	0	0	
H401	Total Number Released	4	4	16	14	6	0	7	a93
H402	Counting/Estimation Method (# Released)	3	5	9	8	7	0	3	a93
H403	Release Location	3	3	15	16	3	0	6	a w
H404	Release Location Coded	4	3	7	5	6	0	4	0.90
H405	Release Date(r)	2	4	16	16	3	0	7	a93
H406	Release Information Coded by Brood Year	3	3	8	7	5	0	4	0.91
H407	Release Residualism Data	4	4	5	1	10	0	1	a99
H408	Release Purpose	3	4	14	7	11	1	4	LO9
H419	Physiological Status @ Rel. (e.g. ATPase)	2	7	9	2	12	2	2	1.19
H410	Size @ Release	2	3	14	13	4	0	5	0.95
H411	Stage or Class (e.g. fry, smolt, yearling)	3	6	15	17	5	0	6	0.90
H412	Type (e.g. production, experimental, index)	3	6	11	10	8	0	5	a94
H413	Release Transition	1	6	5	6	4	1	4	0.95
H414	Outmigration Timing	6	J	11	4	14	1	4	1.03
H415	Riverine Water Conditions After Release	5	8	8	3	14	1	2	1.02
H416	Riverine Habitat Inventory	5	10	1	2	12	0	1	0.82
H417	CWT Marking Data	2	J	11	10	6	0	3	0.95
H418	PIT Tagging Data	2	5	12	12	4	0	6	0.92
H419	Fin Clip Data	1	5	11	11	3	1	3	a97
H420	Chemical Muting Data	1	6	5	7	4	0	3	0.89
H421	Natural Missing Adipose Fin Percentage	4	8	3	3	7	2	2	0.93
H422	Lot Number	4	8	2	9	3	0	4	0.68
H499	Other	0	0	1	1	0	0	1	1.00
H499	Other	0	0	1	1	0	0	1	1.00
H500	***SURVIVAL RATES***	1	1	1	0	4	0	1	
H501	Prespawning Prehatchery Survival Rate	5	5	9	1	13	2	4	1.14
H502	Prespawning @ Hatchery Survival Rate	6	4	9	9	7	0	4	0.84
H503	Egg to Fry Survival Rate	7	6	8	13	5	0	5	0.75
H504	Fry to Smolt Survival Rate	7	6	6	12	6	0	5	0 77
H505	Smolt Outmigration Survival Rate	4	4	14	4	13	2	5	1.17
H506	Smolt to Adult Survival Rate	4	4	15	4	14	2	5	1.18
H507	Escapement to Smolt Survival Rate	5	6	9	3	9	5	3	1.17
H599	Other	0	0	1	0	1	0	0	1.50
H599	Other	0	1	0	0	1	0	0	1.00

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments

Interview No	H100 Comments
C301	Inconsistently Collected And Reported
1101	NOT RESPONSIBLE FOR REDD COUNT REPORTING
1109'	HATCHERY REPORTS & MEMOS; PERSONAL COMM
0128	We Collect Data On Hatchery Strays
0165	Primarily Use Fws Data, Adquate In Most
so01	NO COORDINATED DATA REPORTING (OTHER THA
W101	Unsure On Avail. Some Ex., Lyons Ferry
w117	Klickitat Hatchery

Interview No	H101 Comments
C302	Maintain Regional Hatchery Release Db
1109	NOT CODED
1125	CODED
1129	CODED
O165	Cases For My Needs.
S001	NOT CODED
w117	Klickitat Hatchery
w122	Coded
W124	Wells Hatchery

Interview No	H102 Comments
C302	Spm Database
1101	SOURCE: HATCHERY REPORTS & PERS COMM
S001	NEED THIS IN COORDINATED REPORT (PAC)
w117	Klickitat Hatchery
w137	Hatchery Only, Not Wild Escapement

Interview No	H103 Comments
C302	Spm Database
1101	SOURCE: HATCHERY REPORTS & PERS COMM
S001	NEED THIS IN COORDINATED REPORT (PAC)
W117	Klickitat Hatchery

Interview No	H104 Comments
C302	Maintain Regional Esc. Db
1101	SOURCE: IDFG BUREAU STAFF & HATACHERIES
0202	From ODFW - The Dalles
W119	By Specific Stock
W121	Punch Card Data Sole Reference

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H105 Comments
1101	SOURCE: HATCHERIES
0202	To Round Butte / Pelton Trap
S001	HOW DO I GET THIS INFORMATION?
W119	# Trapped, Volunteers, Supplemental +

Interview No	H106 Comments
C302	Spm Database
1101	METHODS INADEQUATE FOR ACCURATE AGING
S001	NEEDS COORDINATED
W119	By Sex/week Contact: Joe Hymer

Interview No	H107 Comments
C302	Spm Database
1006	NEED BY OCEAN AGE
1101	NO AGE OR LENGTH SPECIFIC INFO
1111	BUT BASED ON ANCIENT LITERATURE
W117	Klickitat Hatchery

Interview No	H108 Comments
1101	SOURCE: HATCHERIES
1111	NOT SURE I NECESSARILY UNDERSTAND
S001	INFO SEEMS TO RESIDE AT INDIV HATCHERIES
W117	Klickitat Hatchery

Interview No	H109 Comments
1003	DATA NEEDED ON COND OF ARR AT RACK & SPA
1101	SOURCE: HATCHERIES, FHL
1111	PROFILES ARE GENERALLY FOR CERTAIN TARGE
W117	Klickitat Hatchery

Interview No	H110 Comments
1101	METHODOLOGY INADEQUATE FOR SE-PARATION
1110	NO WILD FISH RETURN TO DWORSHAK,SEE ABOV
1111	HOW DO WE KNOW WILD
1126	NEED H/W SEPARATION
S001	NOT ALL HATCHERY FISH ARE MARKED
S003	NEED TO KNOW EFF OF.HATCHERY ON WILD POP
W119	Contact: Joe Hymer

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H111 Comments
1101	METHODOLOGY INADEQUATE FOR DETERMINATION
S001	UNKNOWN-, POSSIBLY UNKNOWABLE

Interview No	H112 Comments
W117	Klickitat Hatchery
W119	By Volunteers, Trapped, Supplemental

Interview No	H113 Comments
1001	HISTORICAL SUMMARY
1109	STAT. WKS HISTORICAL SUMMARY
0203 .	Stat. Wks? Yes Historical Summary? Yes
w117	Klickitat Hatchery
W119	Yes, Stat. Wks
W121	Stat. Wks, Historical Summary
w122	Historical Summary
w139	Stat. Wks.

Interview No	H114 Comments
1101	SOURCE: HATCHERIES
W117	Klickitat Hatchery
W119	Dates Of {?}, Surplus Kills, Etc.

Interview No	H115 Comments
1101	SOURCE: HATCHERIES
1110	WE USED TO TAKE THIS DATA. AVAIL 85-89
1111	OLD DATA HOWEVER
W102	Scale Age Far More Important
W117	Klickitat Hatchery
W119	Contact: Joe Hymer

Interview No	H117 Comments
1101	DATA NOT COLLECTED
1111	OLD DATA
W102	No Value

Interview No	H118 Comments
1126	SP/SU/FA SNAKE RIVER CHINOOK
W121	Survivability May Be Reduced By Domest'n

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H119 Comments
1003	MERISTICS MORPHOMETRICS
1101	MERISTICS 2MN MORPHOMETRICS 2MN
1111	EVERYONE IS STILL WORKING ON THESE
0125	Meristics? Yes Morphometrics? Yes
W102	No Meristics, No Morphometrics
W120	Meristics, Morphometrics
W123	Meristics & Morphometrics Need More Info
W136	Meristics & Morphometrics, Maybe
w143	Meristics - Yes
w145	Possibly-Depends On Mgmnt Needs

Interview No	H120 Comments
1110	WE DONT HAVE REPEAT SPAWNERS
1111	I WORK IN SALMON

Interview No	H121 Comments
1101	SOURCE: HATCHERIES
W117	Klickitat Hatchery

Interview No	H122 Comments
1114	JACK %, JACK TYPES, SIZE OF LOST/NOTAGS
1126	STEELHEAD
1129	JACK %
0125	Jack %: Y Jack Types: Y Sz Of Lost/n: Y
W102	Mini Jacks Vs. Normal
W120	Jack %, Jack Types

Interview No	H123 Comments
1101	SOURCE: HARVEST MONITOR PROJECT IDFG
1110	IDFG COLLECTS THIS INFO
0202	ODFW - The Dalles
W102	Unavailable Outside Subbasin
W119	Contact: Joe Hymer
W121	Question Punch Card Numbers
w137	Assuming Ret'ed Punch Cards Are Accurate

Interview No	H124 Comments
1101	SOURCE: TRIBAL BIOLOGISTS
1110	NEZ PERCE TRIBE IS SUPPOSED TO COLLECT
1111	HARD TO GET GOOD DATA
0202	ODFW - The Dalles
w137	Only Known In Yak Basin. +

Appendix Table D- 13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H200 Comments
C312	Location By Lat/brg & RR#
1109	PERSONAL COMMUNICATION

Interview No	H201 Comments
1003	VERY IMPORTANT
W117	Klickitat Hatchery
W150	Have GIS Prod Locs W/desc Attributes

Interview No	H202 Comments'
1003	VERY IMPORTANT
W117	Klickitat Hatchery
W150	GIS Prod Locs W/desc Attributes

Interview No	H203 Comments
I003	VERY IMPORTANT
W117	Klickitat Hatchery
W150	GIS Prod Locs W/desc Attributes

Interview No ---W----T---	H204 Comments
1101	CWT LAB
1110	FWS HAS A SYSTEM
1114	NEEDS STANDARDIZATION
1129	PROD CODES TO FOLLOW FROM AD-EGG-SM-AD
O125	Particular Coding: Yes
0203	Particular Coding? Os, Ir, Rb.
W120	Needs To Be Uniform For All Users

Interview No	H205 Comments
1101	HATCHERIES
W117	Klickitat Hatchery
W150	GIS Prod Locs W/desc Attributes

Interview No	H206 Comments
W117	Klickitat Hatchery

Appendix Table D- 13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H207 Comments
1003	FROM PATHOGEN/FISH CARRIER POINT OF VIEW
1129	DISEASE FREE? SP WATER ANALYSIS FOR EACH
0128	Specify? Does Effluent Comply W/deq Reg?
0203	Specify: Os Only
W105	O2, NH2, Ph
W117	Klickitat Hatchery
w129	Pertaining To Reuse Water
W131	Too Much Poor Logging Practices
w137	Monitored By DOE
w144	Complete & Current Profile

Interview No	H208 Comments
1003	PATHOGEN RELEASE INTO ENV=I; WQ=A
1111	FORMALIN DISCHARGE IS NOT MONITORED
0203	Os
W101	Have No Idea On Availability
W105	O2, NH3, Ph
W117	Klickitat Hatchery
w137	Monitored By DOE

Interview No	H209 Comments
C302	NMFS Survey Of Hatcheries
1002	CAPACITY AS A FUNCTION OF FISH QUALITY
1003	OVERLOADING CAUSES HEALTH & SURV PROB
1101	DESIGN MEMORANDUMS-HATCHERY REPORTS
1110	WE NEED MORE DATA HERE
0203	Os
S001 .	DENSITY EFFECTIVENESS STUDIES NEEDED
W117	Klickitat Hatchery

Interview No	H210 Comments
1002	IDENTIFY CRITICAL UNCERTAINTIES
1101	HAT. REPTS
1111	SOP'S NOT PUBLISHED IN ADEQUATE DETAIL
0203	Os
W117	Klickitat Hatchery

Interview No	H211 Comments
1003	INCONSISTENT FROM YEAR TO YEAR'
1101	HAT. REPTS
1111	NOT SURE WHAT YOU MEAN THERE
0170	Gen Fits Cat.1 Haven't Tried Data Recent
0203	Os
S001	DOES ANYONE USE THE SAME NUMBERS?

Appendix Table D- 13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H212 Comments
1002	WITH RESPECT OF ADULT RETURNS,NOT SMOLTS
1003	NUMBER STOCKS, SPECIES, ETC
1101	HAT. REPTS
1111	WE KNOW LITTLE ABOUT HATCHERIES; EACH IS
0203	Os
W121	Reluctance To Discuss Problems

Interview No	H213 Comments
1101	IDFG-FISHERIES- BUREAU
0203	Os
W117	Often Later Than Desirable

Interview No	H300 Comments
W118	Net Pens, Fall Chin, Up-River Bright Stk

Interview No	H301 Comments
1101	HATCHERY DIARIES, RPTS
1111	RATE & FREQ UNKOWN
0203	Os
W105	Weight Units Fish Per Pound Per Month
W117	Klickitat Hatchery

Interview No	H302 Comments
1101	HAT RPTS MM PER MO
1110	FISH PER LB & LENGTH
1129	NUMBER FISH UNITS; FISH PER POUND
0203	Os, Units #, Per Lb.
W105	Variable Max Load Yes Final Yes
W117	Units-Fish Per Pound & Length
W120	Growth In Length, MM Per Day

Interview No	H303 Comments
I101	H RPTS, NARRATIVES
I129	DENSITY INDEX
0125	Max Load: Yes Final: Yes
W107	Max Load Yes, Final Yes
W117	Max Load Yes, Final Yes
w144	Site & Facility Specific

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H308 Comments
1101	H RPTS
0170	Gen Fits Cat.1 Haven't Tried Data Recent
W102	Transfer Profiles Cumbersome To Track
W117	Klickitat Hatchery
W118	Net Pens, Fall Chin, Up-River Bright Stk

Interview No	H309 Comments
1101	H RPTS
W107	Smolts Only (One Or Two Year)
W117	Klickitat Hatchery
W118	Net Pens, Fall Chin, Up-River Bright Stk

Interview No	H400 Comments
1109	HATCHERY REPORTS & MEMOS; PERS COMMUNICA

Interview No	H401 Comments
C302	Maintain Regional Hatch. Rel. Db
1002.	ERROR BOUNDS SHOULD BE INCLUDED
1101	MARKING SECTION, & HATCHERY PERSONNEL .
1114	SOME PROBS'OF AGREEMENT IN EARLIER YEARS
W102	Wdf Yes, Usfws Are Tardy.
w117	Klickitat Hatchery
W123	Some Sites Data No Good-Predation Losses
w147	Also Contact Peter Hahn/Terry Lovgren
W148	Not A Good Central Location Currently

Interview No	H402 Comments'
1101	MARKING SECTION, & HATCHERY PERSONNEL
W117	Klickitat Hatchery
w121	Usually In #/lb, Don't Indic How Sampled

Interview No	H403 Comments
C302	Maintain Regional Hatch. Rel. Db
c312	By Lat/long & RR filed #
1101	HAT RPTS, PERS COMM
0500	Determined By Management Biologists
W117	Klickitat Hatchery

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments (continued) .

Interview No	H404 Comments
C302	Type Of Code Necessary: EPA Reach No.
C316	Type Of Code Necessary: Lat/long
I114	NOW USING EPA REACH CODE
1125	EPA STREAM REACH CODE
1134	EPA REACH CODES
0203	Type Of Cod Necess: Waterbody Codes ODFW
0500	Determined By Management Biologists
W120	Code Simple Numberical OTWRIA
w122	Wdf Code
W148	Code Necessary: Acclimated/direct

Interview No	H405 Comments
1003	TIMING
1125	FIRST, LAST.
0500	Determined By Management Biologists
S001	FIRST, LAST
W117	Klickitat Hatchery
W119	First And Last
W120	Percent Of Release By Each Date
W131	Various. First April, Last June

Interview No	H406 Comments
so01	RELEASE YEAR BETTER
W117	Klickitat Hatchery

Interview No	H407 Comments
I110	NO DATA
W121	No Idea Fish Vanish

Interview No	H408 Comments
C316	Supplementation: Yes Production: Yes
1125	ID, VB, SUPPLEMENTATION, PRODUCTION
0500	Determined By Management Biologists
W107	Planning/Mgmt, Not Hatchery
W131	Supplementation, Production

Interview No	H409 Comments
1003	SEE H399.OTHER METHODS BETTER THAN ATPAS
1101	BPA PROSPECTS, FPC
I111	NOT SYSTEMATIC
W117	Klickitat Hatchery
W121	Expensive For Routine Sampling
W147	Collect Some Data

Appendix Table D-13: CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H410 Comments
1002	RANGE & ERROR BOUNDS
1101	HAT RPTS
1111 .	SIZE IMP ALSO HOW QUICKLY THEY GOT TO TH
S001	NEED NMBRS/LB & PRESMOLT/SMOLT DETERMINA
W107	Need Average And Deviation Measure
W117	Klickitat Hatchery
W119	M-M., Fish/lb
W120	Unif Rprtg-Lgth/Grams W/assoc Coeff Var
W121	Inconsistant Sampling Raises Questions
w133	Length/freq Data For Juveniles In Estry+

Interview No	H411 Comments
1101	HAT RPTS
1147	PRE-SMOLT
0500	Determined By Management Biologists
W117	Klickitat Hatchery
w143	Inconsistent Definitions - Stds Needed

Interview No	H412 Comments
1003	NEEDS TO BE DONE BY QUALIFIED PEOPLE
0500	Determined By Management Biologists
W107	Again - Planning Or Mgmt, Not Hatchery
W117	Klickitat Hatchery
W131	Production

Interview No	H413 Comments
1001	VOLITIONAL, ACCLIMATED
W107	Forced,Volitional,Acclimated,Combination
W120	Split Release, Volitional, Acclimated
W131	Volitional
W148	Curr Data Only Is % Of Precocious. Males

Interview No	H4 14 Comments
1101	INITIATING RESEARCH, SOURCES:- OTHER,IDFG
W107	From Where To Where?
w117	Klickitat Hatchery
W125	To McNary Dam
W13 1	Temp Avg 56, Instream Flows Vary
w133	'66-83; '87-90

Appendix Table D-13. **CIS** Hatchery Needs Survey - Annotated Comments **(continued)**

Interview No	H415 Comments
1001	TEMPERATURE, INSTREAM FLOWS
1003	BEFORE OR AT RELEASE; TEMP, IN FLOWS
1109	TEMP YES INSTREAM FLOWS YES
I111	TEMPERATURE, INSTREAM FLOWS
1125	TEMPERATURE, INSTREAM FLOWS
1134	TEMPERATURE, INSTREAM FLOWS
W107	Temperature, Instream Flows
w117	Klickitat Hatchery
W120	Temperature, Instream Flows
w121	Temperature Desirable
w129	Temperature & Instream Flows

Interview No	H416 Comments
W107	Not Hatchery Responsibility

Interview No	H417 Comments
1 0 0 3	CAUSES TOO MUCH MORTALITY VIA STRESS (ID
1101	SOURCE: IDFG MARKING SECTION-CWT LAB
0500	Determined By Management Biologists
W102	Not Up-To-Date
W117	Klickitat Hatchery
W118	Net Pen Study - FACH, UP RIVER BRIGHT

Interview No	H418 Comments
1003	CAUSES TOO MUCH MORTALITY VIA STRESS (ID

Interview No	H419 Comments
1003	STRESSFUL
1101	SOURCE: IDFG MARKING SECTION & CWT LAB
0500	Determined By Management Biologists
W121	Some Inhouse Clipping Confuse Others

Interview No	H420 Comments
1003	STRESSFUL AND QUESTIONABLE BENEFIT
1110	NO DATA

Interview No	H421 Comments
I110	NO DATA

Appendix Table D- 13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H422 Comments
1114	NEEDS BETTER DOCUMENTATION
W117	Klickitat Hatchery

Interview No	H500 Comments
1109	PERSONAL COMMUNICATION; HATCHERY REPORTS

Interview No	H502 Comments
W117	Klickitat Hatchery

Interview No	H503 Comments
C302	Spm Database
I1Q1	INITIATING A DATABASE FROM H. RPTS
w117	Klickitat Hatchery
w143	Stds. And Definition Problems.

Interview No	H504 Comments
C302	Spm Database
1101	INITIATING A DATABASE FROM H. RPTS
W117	Klickitat Hatchery
w143	Stds. And Definition Problems.

Interview No	H505 Comments
1003	ALSO INCLUDE SALTWATER ENTRY SURVIVAL RA
1101	INITIATING A DATABASE FROM H. RPTS
1107	TO SUB-BASIN TO RACK STREAM
W107	Not Hatchery Responsibility

Appendix Table D-13. CIS Hatchery Needs Survey - Annotated Comments (continued)

Interview No	H506 Comments
1001	TO SUBBASIN, TO RACK
1003	SUBBASIN, RACK
1109,	TO SUB-BASIN TO RACK
I110	TO SUBBASIN, TO RACK, LOWER GRANITE DAM
1126	TO SUBBASIN, TO RACK
1129	TO SUBBASIN, TO RACK
1134	TO SUBBASIN; EPA REACH OR STREAM
1137	TO SUBBASIN, TO RACK
1147	TO SUBBASIN
0125	To Sub-Basin? Yes To Rack? Yes
0128	Other? To Harvest Of Escapement.
0202	To Sub-Basin? Yes To Rack? Yes
S001	SUBBASIN, RACK
W102	Sub I, Rack A, Other Not All Represented
W107	Subbasin, Rack, Dams
W108	Subbasin, Rack
W117	To Sub-Basin Yes, To Rack Yes
W120	Overall
w121	To Subbasin, To Rack A, Punchcard
W125	To Subbasin, To Rack
w129	To Subbasin & To Rack
W131	To Rack & Catch
W146	Total
W148	Yes - Sub-B&in, rack & Straying Rates

Interview No	H507 Comments
1001	DEFINE?
W107	Can Calc Certain Points From Existg Data
W120	Not Sure What This Is

Appendix Table D-14. Hatchery Data Needs Survey User-contributed questions

September 25, 1991

H199 Data Element	Need	Avail.	Survey#
BLOOD PRESPAWNING MORTALITY- NUMEROUS CAUSES	2	I	1003
VERT TRANS PATHOGEN PREVALENCE. IPNV & BKD Import:	3	I	1003
Hatchery Ocean (by Area?) Commercial Harvest	3		0125
Hatchery Col. R. Commercial Harvest.			0125
Hatchery Commercial Harvest - ODFW - Portland	3	A	0202
Ocean Harvest	3	I	w129
Mating Scheme - More Descrptive Than Spawners	3	I	w143

H299 Data Element	Need	Avail.	Survey#
HATCHERY DISEASE HISTORIES & PRESENT CLASSIF	3	A	1003
PERMIT SYSTEM FOR RECEIPT/MOVEMENT OF DISEASED FISH	3	M	1003
MONTHLY BUDGET MONITORING	3	I	I129

H399 Data Element	Need	Avail.	Survey#
PHYSIOLOGIC INDEX WORK AT PRERELEASE. ADD TO H306	3	A	1003

H499 Data Element	Need	Avail.	Survey#
STOCK HEALTH @ RELEASE. INCLUDE PHYSIOLOGIC INDEX	3	A	1003
List Of Annual Reprogramming	3	I	W1O2
Shape At Release - Correlates W. Changes In ATPase	3	M	W136
Quality Control - Marking Method	2	I	W143
SURVIVAL RATE TO RELEASE. INCLUDE DISEASE HISTORY	3	A	1003

H599 Data Element	Need	Avail.	Survey#
SMOLT SALTWATER ENTRY SURVIVAL RATE	3	I	1003
IN BASIN SMOLT SURVIVAL	2	I	1003

H699 Data Element	Need	Avail.	Survey#
Historical Trends of all of the above			coo2
System Operations (Flow, Temperature, Spill)			coo2
Water Temperature Details.			coo2
HATCHERY RES ACTIVITIES (EVAL)-WHAT/WHERE/WHEN-.-	3	I	1002
FRY TO PARR SURVIVAL	3	A	1003
INFLUENCE OF SEDIMENT, COVER, HABITAT	3	I	1003
PARR TO SMOLT SURVIVAL	3	A	1003
STOCK HISTORY/GENETIC PROFILE	3	I	1003
HATCHERY EFFECTIVENESS ASSESSMENT - VIABLE PRODUCT	3	I	1003
HATCHERY EFFECTIVENESS - COST/BENEFIT	2	I	1003
IN HATCHERY MORTALITY OR MARKED FISH-CWT, FRS			1101
SAR FOR CWT FISH			1101
SAR FOR NOT CWT HATCHERY FISH			1101
HEALTH INDICES - MORE DATA	3	I	1121
COORDINATED RELEASE NUMBERS, DATE, BR.YR AGE LOC.			SOO1
STURGEON-FEASIBILITY			so01
Smolt To Smolt (to Mouth Of River)			W1O8
Length Of Time Adults Held Prior To Spawning	2	I	W12O
Temperature Units To Ponding	2	I	W12O
Type Of Incubation	2	I	W12O
Water Temperature Manipulation	2	I	W12O
Water Temperature During Holding Of Adults	2	I	W12O
Main Stem & Esturine Survival (Large river losses)	3	M	W121

Appendix Table D-15. CIS Data Needs Survey Respondents to HATCHERY SECTION

Survey Respondent	Affiliation	Location
Dauble, Dennis	Batelle Memorial Institute	Richland, WA
Fisher, Tim	Bonneville Power Administration	Portland, OR
Pansky, Tom	Bonneville Power Administration	Portland, OR
Shaw, Mark	Bonneville Power Administration	Portland, OR
Roger, Phil	CR Inter-tribal Fish Commission	Portland, OR
Hays, Steven	Chelan County PUD	Wenatchee, WA
Foster, Gene	DEQ - Water Quality Division	Portland, OR
Lackey, Robert T.	EPA Environmental Research Lab.	Corvallis, OR
Bjornn, Ted	ID Coop Fish & Wildlife Unit	Moscow; ID
Allen, Stan	Idaho Dept. of Fish & Game	Boise, ID
Bowler, Bert	Idaho Dept. of Fish & Game	Boise, ID
Hassemer, Pete	Idaho Dept. of Fish & Game	Boise, ID
Holubetz, Terry	Idaho Dept. of Fish & Game	Boise, ID
Kiefer, Sharon	Idaho Dept. of Fish & Game	Boise, ID
McArthur, Tom	Idaho Dept. of Fish & Game	Boise, ID
Moore, Virgil	Idaho Dept. of Fish & Game	Boise, ID
Reid, Will	Idaho Dept. of Fish & Game	Boise, ID
Rogers, Tom	Idaho Dept. of Fish & Game	Boise, ID
Bowles, Ed	Idaho Dept. of Fish & Game	Eagle, ID
Cannamela, Dave	Idaho Dept. of Fish & Game	Eagle, ID
Hauck, Kent	Idaho Dept. of Fish & Game	Eagle, ID
Leitzinger, Eric	Idaho Dept. of Fish & Game	Eagle, ID
Buettner, Ed	Idaho Dept. of Fish & Game	Lewiston, ID
Cochnauer, Tim	Idaho Dept. of Fish & Game	Lewiston, ID
Duke, Rodney	Idaho Dept. of Fish & Game	Lewiston, ID
Scully, Richard	Idaho Dept. of Fish & Game	Pocatello, ID
Lukens, Jim	Idaho Dept. of Fish & Game	Salmon, ID
Dawley, Earl	National Marine Fisheries Serv	Hammond, OR
Ledgerwood, Richard	National Marine Fisheries Serv	Hammond, OR
Hawkes, Clayton	National Marine Fisheries Serv	Portland, OR
Smith, Bob	National Marine Fisheries Serv	Portland, OR
Winans, Gary	National Marine Fisheries Serv	Seattle, WA
Larson, Ed	Nez Perce Tribe, Fisheries	Lapwai, ID
Wasson, Norm	Nez Perce Tribe, Fisheries	Lapwai, ID
Whitman, Si	Nez Perce Tribe, Fisheries	Lapwai, ID
Anderson, Duane	Northwest Power Planning Council	Portland, OR
Robart, Randy	Oregon Dept. Of Fish & Wildlife	Maupin, OR
Massey, Jay	Oregon Dept. of Fish & Wildlife	Clackamas, OR
Carmichael, Rich	Oregon Dept. of Fish & Wildlife	Lagrande, OR
Nyara, Bill	Oregon Dept. of Fish & Wildlife	Madras, OR
Phelps, Jim	Oregon Dept. of Fish & Wildlife	Pendleton, OR
Corrarino, Charlie	Oregon Dept. of Fish & Wildlife	Portland, OR
Buckman, Bob	Oregon Dept. of Fish & Wiidlife	Seaside, OR
Eddy, Bruce	Pacific Power Co.	Portland, OR
Hymer, Joe	Pacific States Marine Fish. Com.	Battle Ground, WA
Larrick, Walter	Roza Irrigation District	Sunnyside, WA
Smith, Bruce	Salmon National Forest	Salmon, ID
Kutchins, Keith	Shoshone-Bannock Indian Tribes	Fort Hall, ID
Rowe, Mike	Shoshone-Bannock Indian Tribes	Fort Hall, ID
Wick, Sarah	US Army, Corps Of Engineers	Walla Walla, WA
Athem, Jim	US Army, Corps of Engineers	Portland, OR
Tanovan, Bolyvong	US Army, Corps of Engineers	Portland, OR
Crase, Frederick	US Bureau of Reclamation	Boise, ID
Miller, Bill	US Fish & Wildlife Service	Ahsahka, ID

Appendix Table D- 15. CIS Data Needs Survey Respondents to HATCHERY SECTION
- continued -

Survey Respondent	Affiliation	Location
Herrig, Dan	US Fish & Wildlife Service	Boise, ID'
Beeman, John	US Fish & Wildlife Service	Cook, WA
Banks, Joe	US Fish & Wildlife Service	Longview, WA
LaMotte, Ed	US Fish & Wildlife Service	Underwood, WA
Olney, Fred	US Fish & Wildlife Service	Vancouver, WA
Roth, Tim	US Fish & Wildlife Service	Vancouver, WA
Overton, Kerry'	US Forest Service	Boise, ID
Anderson, Kathy	US Forest Service, Nez Perce	Grangeville, ID
Donnelly, Robert	University Of Washington	Seattle, WA
Moffitt, Christine	University of Idaho	Moscow, ID
LeFleur, Cindy	Washington Dept. of Fisheries	Battle Ground, WA
Aksamit, Richard	Washington Dept. of Fisheries	Cathlamet, WA
Anderson, Ted	Washington Dept. of Fisheries	Gleenwood, WA
Castaneda, Ron	Washington Dept. of Fisheries	Kalama, WA
Pedersen, Paul	Washington Dept. of Fisheries	Mattawa, WA
Amos, Kevin	Washington Dept. of Fisheries	Olympia, WA
Appleby, Andy	Washington Dept. of Fisheries	Olympia, WA
Foster, Robert	Washington Dept. of Fisheries	Olympia, WA
Fuss, Howard	Washington Dept. of Fisheries	Olympia, WA
Hopley, Bill	Washington Dept. of Fisheries	Olympia, WA
Michak, Patty	Washington Dept. of Fisheries	Olympia, WA
Woodin, Rod	Washington Dept. of Fisheries	Tumwater, WA
Wagner, Paul	Washington Dept. of Fisheries	Umatilla, OR
Toedtemeier, Guy	Washington Dept. of Fisheries	Washougal, WA
LaVoy, Larrie	Washington Dept. of Fisheries	Wenatchee, WA
Nicolay, Robin	Washington Dept. of Fisheries	Woodland, WA
Williams, Kenneth	Washington Dept. of Wildlife	Brewster, WA
Schuck, Mark	Washington Dept. of Wildlife	Dayton, WA
Leider, Steven	Washington Dept. of Wildlife	Kelso, WA
Lucas, Bob	Washington Dept. of Wildlife	Kelso, WA
Hahn, Peter	Washington Dept. of Wildlife	Olympia, WA
Howerton, Jack	Washington Dept. of Wildlife	Olympia, WA
Kerwin, John	Washington Dept. of Wildlife	Olympia, WA
Knutson, Lea	Washington Dept. of Wildlife	Olympia, WA
Mongillo, Paul	Washington Dept. of Wildlife	Olympia, WA
Tipping, Jack	Washington Dept. of Wildlife	Onalaska, WA
Byrne, James	Washington Dept. of Wildlife	Vancouver, WA
Dugger, Carl	Washington Dept. of Wildlife	Vancouver, WA
Weinheimer, John	Washington Dept. of Wildlife	Vancouver, WA
Brown, Larry	Washington Dept. of Wildlife	Wenatchee, WA
Anderson, Eric	Washington Dept. of Wildlife	Yakima, WA
Lind, David	Yakima Indian Nation	Toppenish, WA