Final Report
SMALL & MINOR WATERCOURSES ANALYSIS for Cochise County, Arizona

Contract No. AD 990205

ARIZONA STATE LAND DEPARTMENT

August 1, 2000

Stantec Consulting Inc.
In Association with
JE Fuller/Hydrology & Geomorphology, Inc.

Stantec

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Contract No. AD 990205

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FOR COCHISE COUNTY
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Executive Summary

The small and minor watercourses in Cochise County were evaluated using the three-level evaluation process that was previously developed by the project team (Stantec, 1998 & 1999b). This evaluation process analyzes the watercourses at increasing levels of detail to assess susceptibility and evidence of stream navigability.

The results of the Level 1 analysis for the 1,739 watercourses in Cochise County indicated 1,698 watercourses (i.e., RL1 data set) fail every diagnostic attribute that was used in the screening process. These diagnostic attributes include *stream type, dam information, historical and modern boating accounts, the existence of fish,* and *any special watercourse status designation*. Forty one (41) watercourses passed the Level 1 analysis to proceed to Level 2 analysis. The Level 2 analysis employs a qualitative approach. All 41 watercourses failed the Level 2 analysis and were dropped from further study and investigation (i.e., RL2 data set). That is, no watercourse within Cochise County was further evaluated in Level 3 and Level 4 analyses.

A list of the rejected and not rejected watercourses at each level of the analysis is presented in the Appendix.

1.0 Introduction

1.1 STUDY BACKGROUND

The State of Arizona is currently adjudicating navigability with regard to ownership interest in streambeds throughout Arizona. Claims of streambed ownership depend on whether or not a given stream was navigable or susceptible to navigation at the time of statehood in 1912. The reader is referred to the Project Background section of the report titled, *"Criteria for Assessing Characteristics of Navigability for Small Watercourses in Arizona"* (Stantec, 1998) for a complete discussion of the history of the navigability issue in Arizona.

The Arizona Navigable Stream Adjudication Commission (ANSAC) is legislatively mandated to establish administrative procedures, hold public hearings, and make recommendations to the Arizona Legislature as to which watercourses were navigable or non-navigable at the time of statehood. To date there have been 14 major river systems that have been adjudicated by the State of Arizona.

ANSAC is required to complete their legislatively mandated tasks by July 1, 2002. There are over 39,039 documented watercourses in Arizona, the vast majority of which are minor or small watercourses. In consideration of these two factors, ANSAC determined that the small watercourses should be considered separately from the major rivers in order to expedite the evaluation process to meet the target date for completion in the year 2002. ANSAC contracted with Stantec in 1997 to: (1) establish minimum technical and historical criteria for small watercourses in accordance with the legislative definition of navigability; (2) develop an evaluation system to assess watercourses utilizing the criteria; and (3) catalog in a database all documented watercourses in the state. That work was completed in 1998 and the results are summarized in *Criteria for Assessing Characteristics of Navigability for Small Watercourses in Arizona* (Stantec, 1998).

In May 1999, ANSAC authorized the Stantec project team to proceed with a Pilot Study to further test the evaluation system and apply the small watercourse criteria to a limited sample of small watercourses in selected locations. The scope of work for the Pilot Study covered Level 1 analysis for the entire State of Arizona, Level 2 analysis for Mohave, La Paz, and Yuma counties, and Level 3 analysis for three watercourses identified to represent the diverse physiographic conditions in Arizona. The project team is currently under contract with the Arizona State Land Department (ASLD) to continue this work by applying the

evaluation system to all remaining small watercourses throughout the state that were not addressed in the Pilot Study. That work is scheduled for completion in June 2001.

The reporting of project results is categorized by county so that ANSAC can conduct hearings within each county for the purpose of determining stream navigability and settling streambed ownership. This report documents the navigability results for Cochise County.

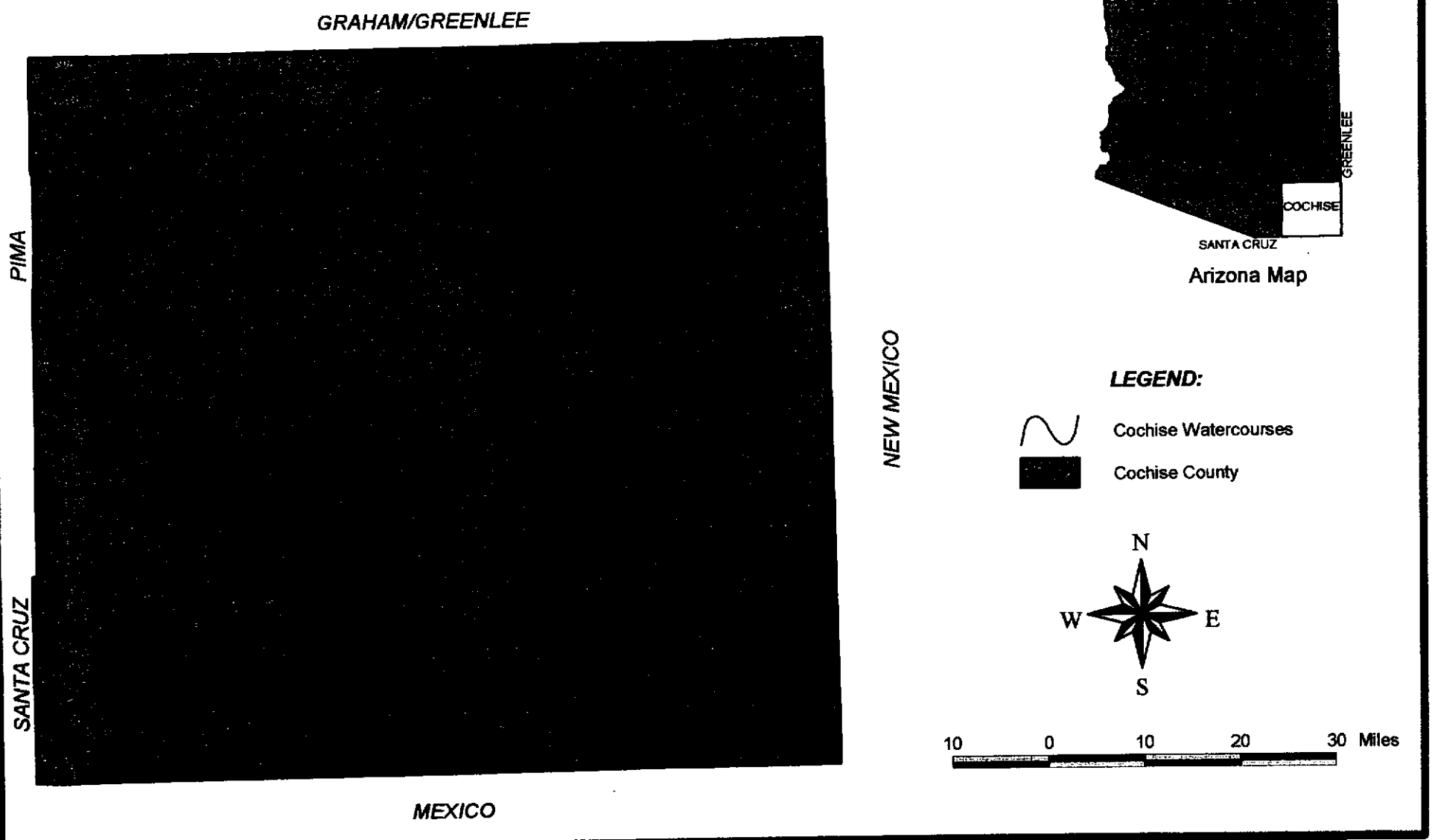
1.2 COUNTY DESCRIPTION

Cochise County is located in the southeast portion of the State and is comprised of about 6,215 mi.^{2} land area. It borders the state of New Mexico to the east, Graham and Greenlee counties to the north and Pima and Santa Cruz counties to the west (see Figure 1). The county lies within the following Latitude and Longitude ranges: *31°20'00"N to 32°25'30"N and 109°03'00"W to 110°27'00"W.* There are 1739 documented small and minor watercourses in Cochise County of which 1618 are unnamed. These watercourses, both named and unnamed, were the subject of the evaluation process involving the three levels of analysis developed by the project team (and a detailed study if any watercourse(s) passed the Level 3 analysis). For more general information about Cochise County, please see Appendix C.

1.3 REPORT OBJECTIVES

The work plan for the small and minor watercourses project was to analyze, summarize and present the results of the three-level classification analysis comprised of the following main work tasks and activities:

FIGURE 1
Small and Minor Watercourses in Cochise County



Task 1 – *Summarize and present the results of Level 1 Analysis*

This task identifies two data sets as the result of the Level 1 Analysis. They are:

(1) NRL1 data set – This data set comprises all watercourses that have at least one affirmative hit from six key stream attributes: *perennial classification, with fish, dam-impacted, with modern boating and historical boating records*, and *with special status*. This data set proceeds to the Level 2 analysis.

(2) RL1 data set – This data set comprises those watercourses that do not have any affirmative hit from the six key stream attributes. This data set is dropped from further analysis and evaluation.

Task 2 – *Summarize and present results from Level 2 analysis.*

Similar to Level 1 analysis, this task identifies two data sets as the result of the Level 2 analysis. They are:

(1) NRL2 data set – This data set is comprised of the watercourses that have potential susceptibility to navigation according to the qualitative evaluation procedure used in Level 2. This data set proceeds to Level 3 analysis.

(2) RL2 data set – This data set is comprised of those watercourses that have no evidence of susceptibility to navigation based on the qualitative analysis performed in Level 2. This data set is dropped from further analysis and evaluation.

Task 3 – *Summarize and present results from Level 3 analysis.*

Similar to Level 1 and Level 2 analyses, this task identifies two data sets as the result of the Level 3 analysis. They are:

(1) NRL3 data set – This data set is comprised of the watercourses that have characteristics of susceptibility to navigation upon evaluation of the geomorphologic, hydrologic, and hydraulic conditions of the watercourses and validation of these conditions with established boating criteria. This data set is recommended for a detailed study.

(2) RL3 data set – This data set is comprised of those watercourses that fail to meet the criteria for susceptibility to navigation.

Task 4 – *Detailed Studies*

Detailed study for Level 3 survivors (NRL3 watercourses) is beyond the scope of the current project. NRL3 watercourses would be investigated in a separate contract with Arizona State Land Department. Though they are not part of the existing project contract, a section is allocated in this report for their integration as their study documentation becomes available.

2.0 Data Requirements

2.1 BASELINE DATA

The watercourse database operates in a Geographic Information System (GIS) environment. This allows the user to analyze the spatial characteristics of the studied watercourses in a graphical or tabular format. The project team selected ArcView GIS, a GIS analysis and thematic map software, for its ease of use and its operational capabilities. In addition, ArcView GIS supports many of the hydrologic assessment activities that have been conducted by state, federal and local agencies. The viability of this data must meet the following criteria to be considered applicable to this project:

- Data are already in or can be readily converted to a GIS format
- Data are readily accessible, technically sound and historically accurate
- Data can be easily sort ed by category or criteria.

The primary data source in the development of the master database was obtained from the Arizona Land Resource Information System (ALRIS). The surface water data sets were originally derived from baseline Digital Line Graph (DLG) maps compiled by the US Geological Survey (USGS), which were further enhanced by the US Environmental Protection Agency (EPA) in several versions called the River Reach Files. The latest version, commonly called RF3, is a federal standard for identifying and cataloging water bodies. The RF3 file was converted to a GIS ARC format by ALRIS and has been distributed and used by various public and private agencies working on water management issues.

The base GIS layer used in the master watercourse database is an ALRIS-converted RF3 data set called STREAMS. It is a line coverage of hydrography (streams) within Arizona and contains 87,735 separate watercourse segments. The STREAMS file includes several fields that were relevant in the development of the master watercourse database. They include the Hydrologic Unit Code (HUC), segment number, mileage, watercourse type, and watercourse name. A binary (yes/no) field for each criterion and a county field were added to aid in the Level 1 sorting process. All manmade water features (canals, aqueducts, flumes, etc.) were removed from the master watercourse database. The major rivers previously assessed by the ASLD for characteristics of navigability or susceptibility to navigation and subsequently adjudicated by the ANSAC were also removed. The resulting master watercourse database contains 76,166 records or stream segments (typically many stream segments comprise one watercourse).

Additional ALRIS Data Sets were used in conjunction with the STREAMS layer to allow for detailed resolution of the physical location of each watercourse. These data sets are listed in Table 1.

TABLE 1
ALRIS Data Sets

Name of Data Set	Data Type / Format	Description
AZSPRINGS	Vector: Point Format: ArcInfo	This coverage consists of spring locations in Arizona. Incorporates information extracted from both the USGS Geonames database and the USGS Digital Line Graphs (DLG).
AZTRS	Vector: Polygon Format: ArcInfo	This statewide coverage consists of the Township, Range and Section grid lines.
County	Vector: Polygon Format: ArcInfo	This polygonal Data Set consists of individual county and an appended statewide coverage.
Lakes	Vector: Polygon Format: ArcInfo	This polygon cover consists of all the lakes in Arizona.
HUCS	Vector: Polygon Format: ArcInfo	This data set consists of Hydrologic Unit Code areas (drainage basins) in Arizona.
DAMS	Vector: Point Format: ArcInfo	This data set consists of jurisdictional dams maintained by ADWR.
GAGES	Vector: Point Format: ArcInfo	This data set consists of streamflow gaging stations maintained and operated by USGS.

2.2 DATA CONVERSIONS

The processing of data during query and search operations was slow due to the large file sizes of the data sets being used. To allow for ease of data storage and manipulation, a method of reducing the file size was undertaken which would not impact the outcome of the analysis.

The largest challenge was identifying a method to combine multiple stream segments into a single watercourse. Approximately 73% (55,387 segments) of the records in the original STREAMS Data Set are without names. In addition, there are a large number of separate watercourses with the same names; (e.g., Sycamore Wash). To resolve this, the project team assigned a unique nomenclature to all unnamed and same-named watercourses. For unnamed watercourses, nomenclature was assigned by combining the HUC ID with the Segment number (e.g. H34-2300). Same-named watercourses were assigned new nomenclature by combining the name with the county within which the

majority of the watercourse was located. If there were more than one same-named watercourse within the same county, an additional numerical ID was added to the name (e.g., Sycamore Creek, Yavapai 1). This naming convention enabled reliable query and display and reduced the watercourse records to 39,039.

The project team assigned township, range, and section (TRS) location attributes to the mouth of each watercourse. The project team was not successful in linking the watercourse database to latitude/longitude GIS coverages, but this was not essential as the database is linked to the TRS system for location referencing.

2.3 DEVELOPMENT OF SATELLITE DATABASES

Six satellite databases were developed for each of the criterion comprising the Level 1 evaluation screening process. These satellite databases were populated with both diagnostic data fields used for the binary queries in the ANSAC master watercourse database, and also informational fields to provide additional information relative to the Level 1 criteria where readily available. The watercourses that tested affirmatively were converted to new satellite databases (themes) based on the criterion queried and were linked to the master database by a unique watercourse name or assigned watercourse ID. Each satellite database can be layered graphically in any selected combination to facilitate watercourse evaluation and to create meaningful reports. Listed below are the six satellite databases (with thematic displays) that were created along with the source documentation associated with each database.

Perennial - Only watercourses that have been classified by both the Arizona State Parks (1995) and ALRIS (1988) as perennial are so identified in the database. The approach used in identifying these watercourses in case of classification conflict was presented and described in detail in an earlier ANSAC report by Stantec (1998). Since the original stream database (comprised of 76,166 stream segments) was recently converted into a watercourse database (comprised of 39,039 records), assignment of perennial stream type to watercourses was made for those washes and streams with at least one perennial segment.

Conflicts in the classification of watercourses beyond the two sources named above are addressed in the Level 2 analysis, which employs a qualitative approach in the evaluation procedure. The project team acquired a GIS coverage developed by the Arizona Game and Fish Department entitled Perennial Waters of Arizona (AG&F, 1995,1997). The perennial streams, originally compiled and mapped by Brown et al (1977, 1978, and 1981), are the foundation of the GIS coverage of perennial streams developed by Arizona Game and Fish Department (1995, 1997). These data are used extensively by both federal and state agencies and were used by the project team to

supplement the original perennial streams classified by Arizona State Parks (1995) and ALRIS (1988). Brown's perennial streams data were not integrated into the Level 1 analysis, but were used for the qualitative assessment in Level 2 for NRL1 watercourses located in Cochise County.

Dams - The Arizona Department of Water Resources (ADWR) developed the GIS coverage in point features indicating the location of all the jurisdictional dams in Arizona. The coverage contains data fields describing essential attributes of those dams important to the agency in matters of dam safety, management and ownership. However, essential data important to the pilot study are not completely populated such as township, range, and section, county, date constructed, dam types, wash location, purpose, and other important physical attributes. The missing information plus the resolution of the dam coverage made the task of identifying dam-impacted streams very difficult. The resolution problem associated with the dam GIS coverage was largely due to inconsistent development standards of different state agencies. Most of the GIS coverages used in the project were developed by ALRIS, while the dam coverage was developed by ADWR.

There are other sources of data for dam structures built in the state of Arizona besides that provided by ADWR. The US Geological Survey (USGS) and the Federal Emergency Management Agency (FEMA) maintain a listing of dams for the entire United States. Inconsistency in the use of names for the dams and data attributes between these various sources resulted in the sole utilization of the ADWR dam database for the study. Originally, the dam coverage from ADWR was comprised of 397 records. After the deletion of dams that are used for mining tailings and those that are located off-stream (a total of 26 records), the final record count was reduced to 371 dams.

Fish - A report published by the USDA Forest Service titled *Run Wild* (Silvey et al, 1984) was used to identify the occurrence of fish species and their habitats in Arizona. Several sources validate the findings listed in the *Run Wild* document. A total of 292 watercourses were identified as having one or more species of fish. Efforts to acquire existing fish GIS database information from Arizona State University (ASU) was not successful. Instead, information gathered from a number of reliable federal and state agency sources was used. These sources are listed in the references.

Historical and Modern Boating – Published accounts of modern boating were obtained from the Greenlee County Historical Society, Coconino Historical Society, Mormon Archives, Apache County Historical Society, Arizona State Parks, Central Arizona Paddlers Club, Arizona Game and Fish Department and professional river rafting companies. One watercourse has a documented account of historical boating while 10 others have modern boating accounts.

Special Status – The Special Status category includes water-related characteristics that make a watercourse of particular interest or concern to

various organizations and/or governmental agencies. Watercourses identified as having the following designations were included in the Special Status database: In-stream Flow Application and/or Permit, Unique Waters, Wild and Scenic, Riparian, and Preserve area. Agencies issuing the Special Status designation were contacted to identify watercourses meeting the criterion.

3.0 Analytical Procedure

A three-level evaluation system shown in Figure 2 was developed by the project team under the previous phase of this project (Stantec, 1998) and adopted for use in the follow-up Pilot Study (Stantec, 1999). The approach involves a multi-level screening process of increasing refinement designed to identify watercourses least likely to meet the statutory and legal definitions of navigability. The evaluation process consists of three levels as follows:

3.1 LEVEL 1 ANALYSIS

The goal of Level 1 of the watercourse evaluation procedure is to perform an initial screening of the entire catalog of small and minor watercourses. The purpose is to eliminate the watercourses most likely to be non-susceptible to navigation and which exhibit no evidence of actual navigation in fact.

The Level 1 analysis is a binary, quantitative sorting process utilizing the data queries programmed into the database catalog. Those queries are the digital expression of the technical and historical criteria considered diagnostic for evaluating watercourses for susceptibility to navigation and for navigation in fact, respectively. The minimum criteria include *stream type, dam information, historical and modern boating accounts, the existence of fish,* and *any special watercourse status designation (see* Figure 3).

The Level 1 screening process is applied to all small watercourses in the database catalog using available information from existing databases compiled by various agencies. Only those watercourses that test negatively to all six criteria are rejected at Level 1 as most likely to be non-susceptible to navigation. All watercourses, which test affirmatively to one or more of the criteria comprising the data queries, require further evaluation at Level 2.

Figure 2
THREE-LEVEL WATERCOURSE EVALUATION PROCEDURE

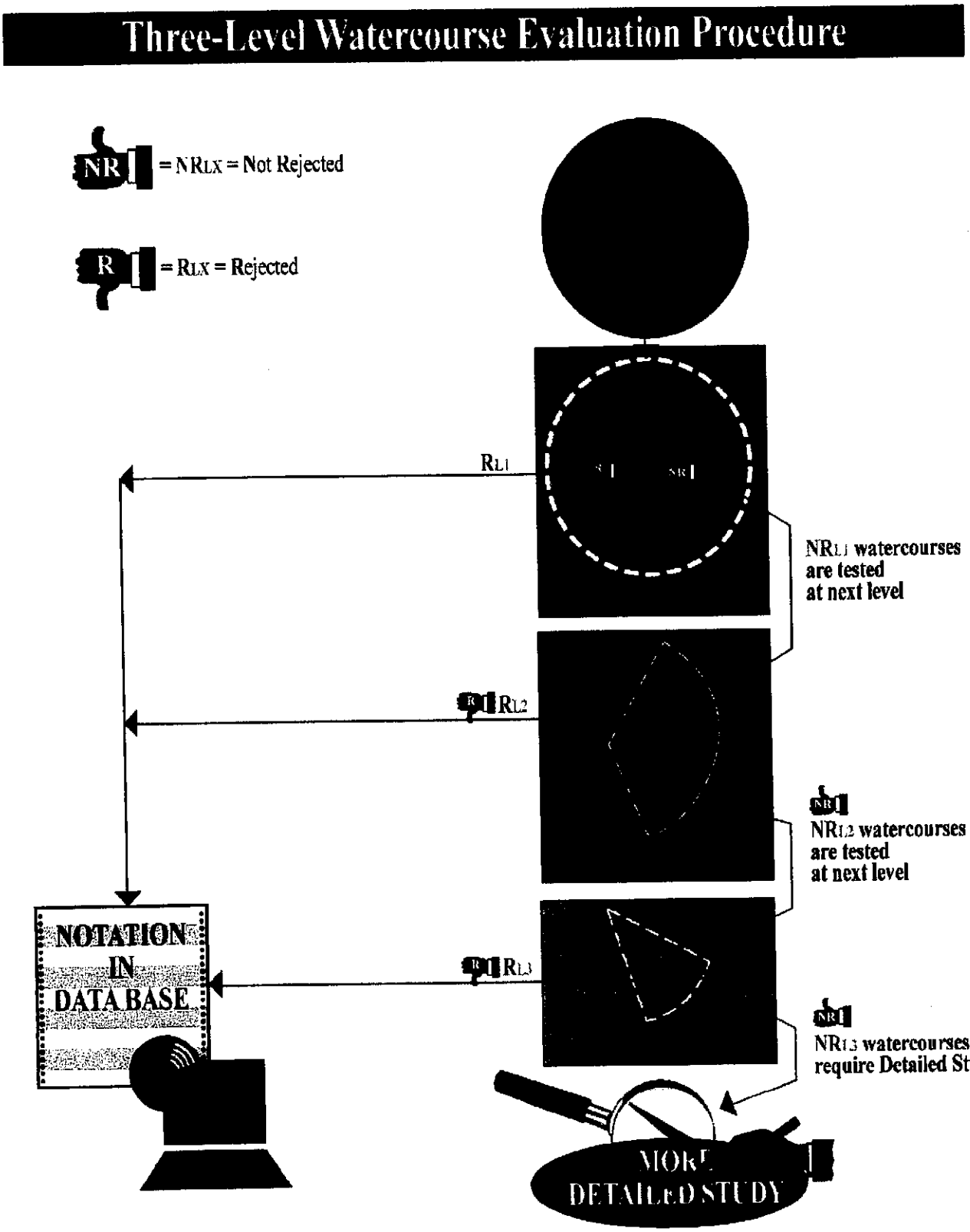
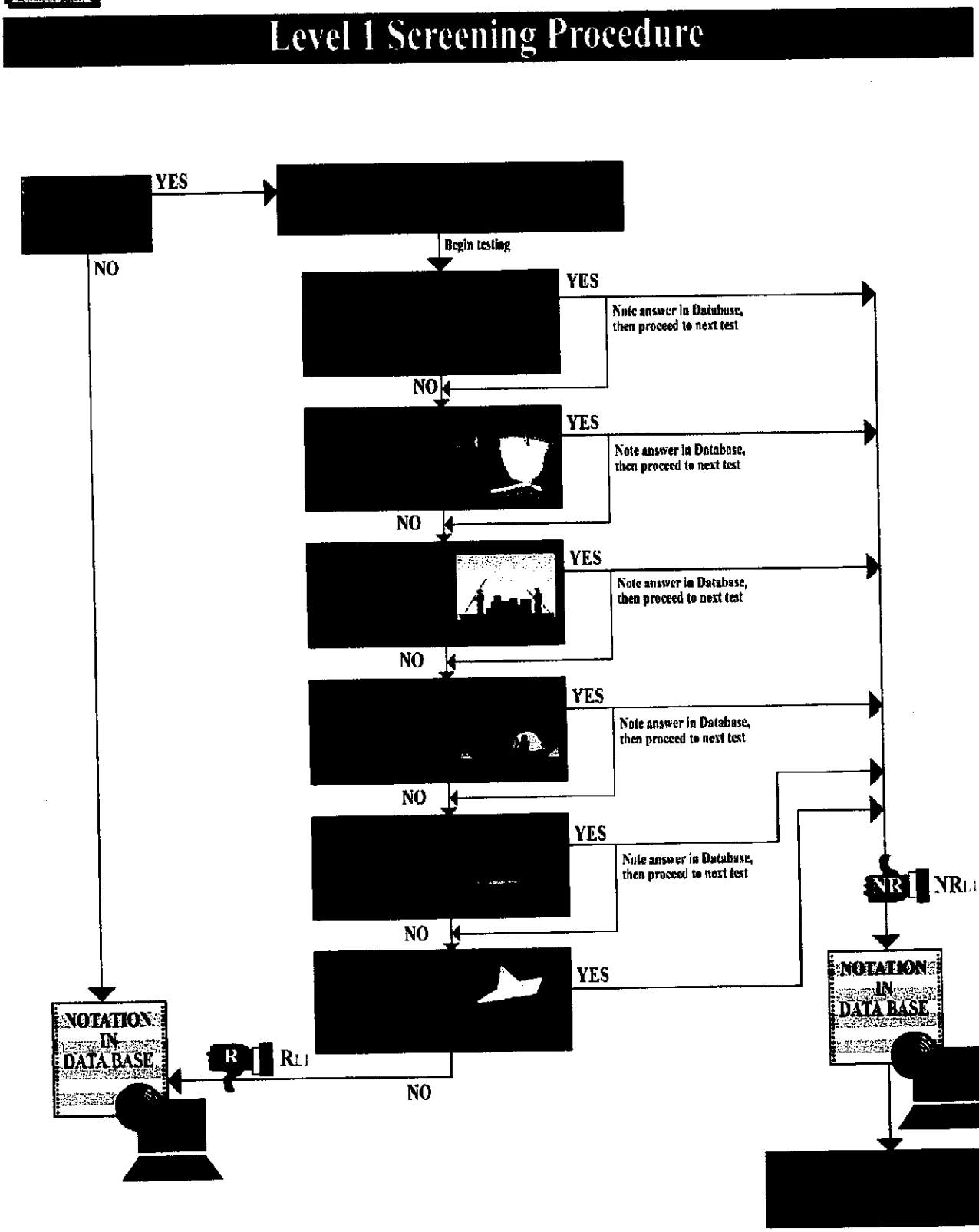


Figure 3
LEVEL 1 SCREENING PROCEDURE



3.2 LEVEL 2 ANALYSIS

The goal of the Level 2 watercourse evaluation procedure is to perform a refined screening to eliminate the watercourses unlikely to be susceptible to navigation. Contiguous watercourse segments were combined to form study reaches to be evaluated in Level 2.

The Level 2 method of approach is more qualitative than the binary data queries employed at Level 1. Level 2 assessment involves the qualitative review of watercourse location, typical watershed characteristics, and typical watercourse characteristics, among other features, for verification and interpretation of the reason(s), which caused them to advance from Level 1.

3.2.1 TWO-STAGE FILTERING PROCESS

The recommended Level 2 methodology involves the further assessment of those watercourse characteristics that tested positively at Level 1 in two parts as shown in Figure 4 and described below:

1. The first-cut filter individually analyzes each criterion that caused a particular watercourse to advance to Level 2 – referred to herein as "affirmative responses" – for information salient to the navigability question as shown in Figure 5. Those watercourses are categorized into three groups as follows:

   Category A – Potentially Susceptible to Navigation

   Category B – Not Likely Susceptible to Navigation

   Category C – Not Susceptible to Navigation

   All watercourses with documented boating accounts - historical and/or modern - will automatically advance to *Category A* comprised of watercourses potentially susceptible to navigation. These watercourses are forwarded for Level 3 analysis.

   The streams classified as *Category C,* which comprised of watercourses not susceptible to navigation, are rejected at Level 2 and will not be investigated further.

2. The second-cut filter analyzes *Category B* watercourses with multiple affirmative hits on multiple segments for diagnostic hit combinations that are evidence of navigation in fact or are indicative of susceptibility to navigation as shown in Figure 6. In addition, a refined approval of applying a rating system is considered to rank the Level 2 watercourses and identify those watercourses that merit further evaluation at Level 3.

Figure 4
Level 2 Screening Concept

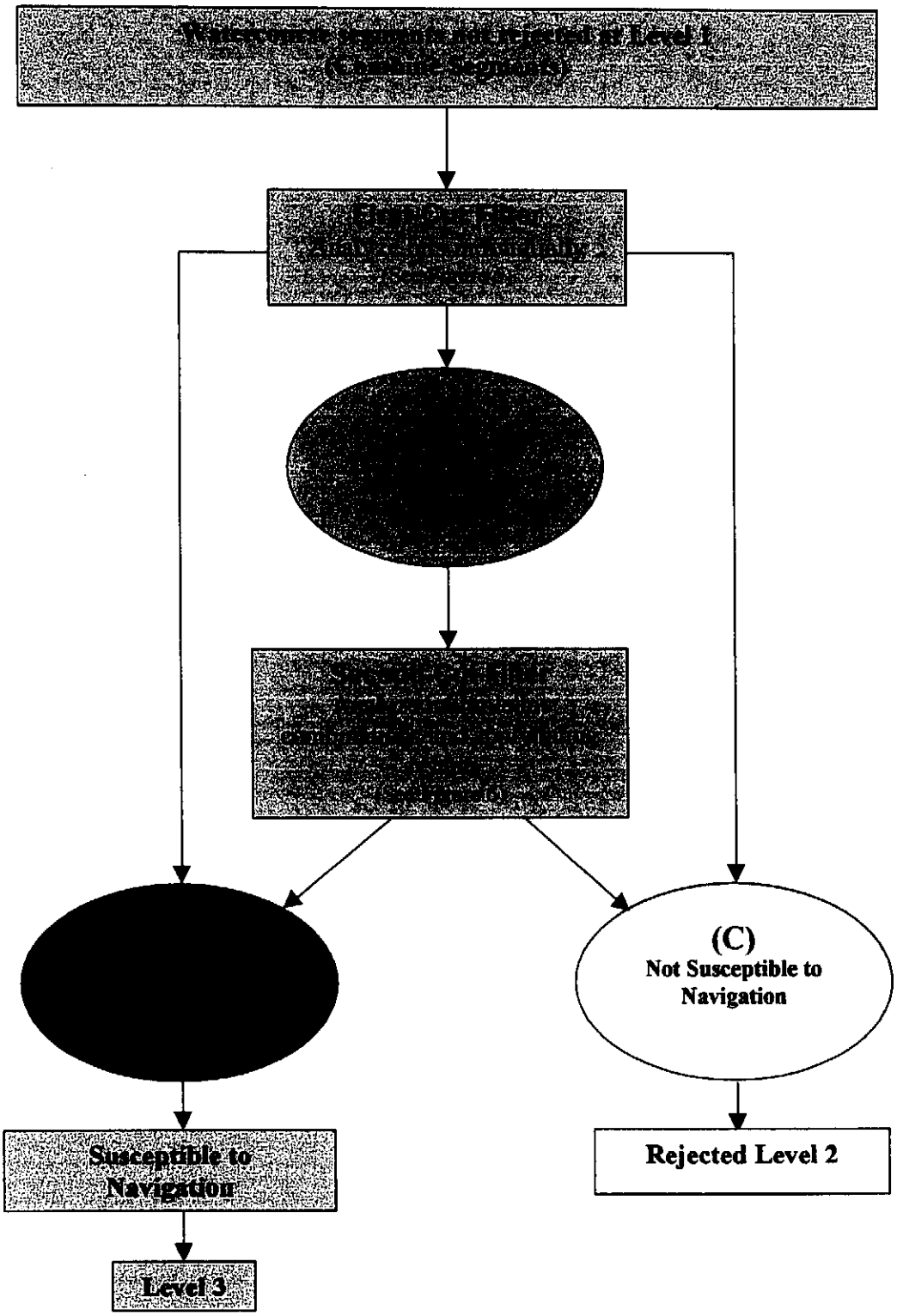


Figure 5
Level 2 Watercourse Screening
First-Cut Filter

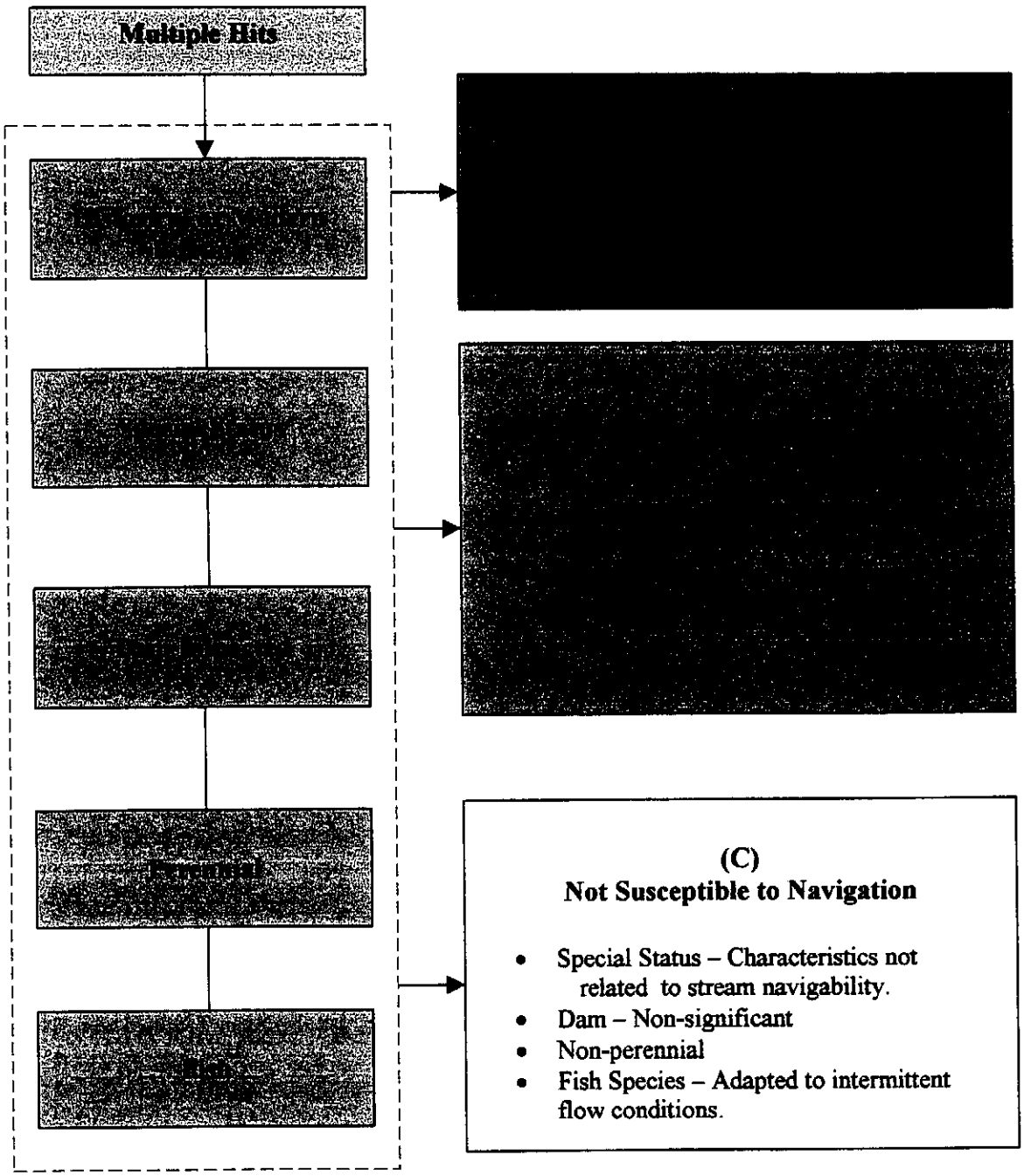
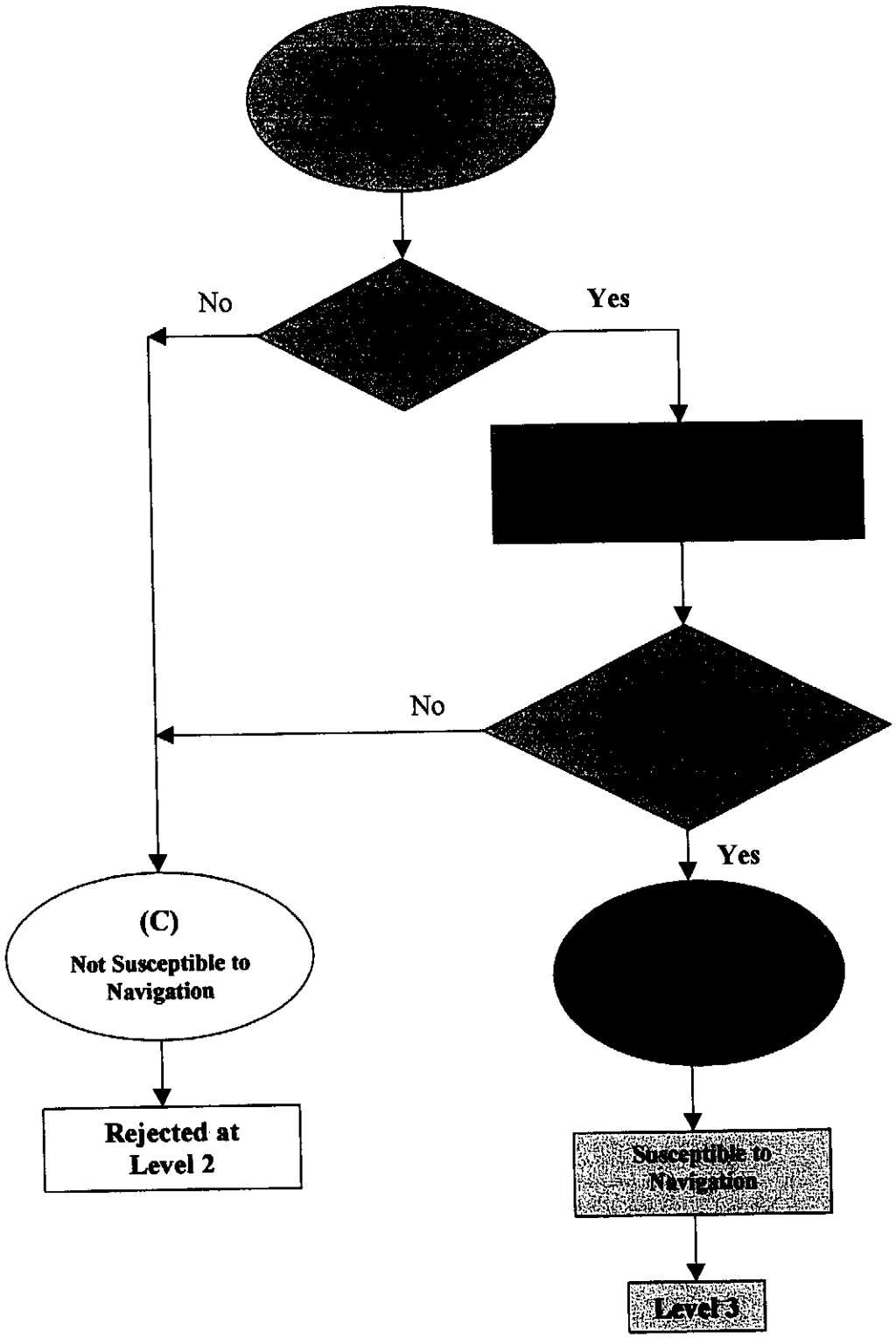


Figure 6
Level 2 Watercourse Screening
Second Cut Filter



The application of the rating system is based on the premise that the six criteria used in the classification analysis of the small and minor watercourses do not carry equal weights as far as establishing potential susceptibility of any given watercourse to navigation.

Ultimately, the second cut filter classifies the watercourses into two categories (i.e., *Category A* and *Category C*) based on their likelihood of being susceptible to navigation. Watercourses with multiple hits indicative of susceptibility on contiguous segments and with evaluated total ratings of more than 11.0 are classified under *Category A. Category A* watercourses, which merit quantitative engineering analysis, are potentially susceptible to navigation and thus, forwarded for Level 3 analysis.

Watercourses, which are determined upon visual and/or manual inspection to exhibit physical characteristics incompatible with successful navigation (such as high elevations or steep slopes), and which received total ratings of 11.0 and below, are classified under *Category C. Category C* watercourses are rejected at Level 2 and are eliminated from further consideration in the study.

3.2.2 DETERMINATION OF NUMERICAL WEIGHTS

The problem of not using a rating system for the watercourses is the assumption that the six criteria for the classification analysis carry the same weight as far as assessing their role to the stream navigability question. For example, historical boating, which is perceived to have the greatest bearing to stream navigability from among the six criteria, should carry the greatest weight possible.

Assigning associated weights to each of the six criteria based on their relevance to stream navigability aids in establishing a ranking system for the watercourses. The ranking system for the watercourses prioritizes the streams as follows: (1) those watercourses that show evidence of potential susceptibility to navigation which are forwarded to Level 3; and (2) those watercourses that show limited or weak susceptibility to navigation which are rejected at Level 2.

In order to assign numerical weights to the six criteria, a rating system was adopted with the goal of ranking the 1025 watercourses statewide to be evaluated in Level 2. The rating system was created by applying the criteria scoring matrix used for value engineering evaluation as shown in Figure B-1 (see Appendix B).

The procedure involves the identification of all the criteria to be used in the analysis. For the current study, the criteria are: *(a) historical boating, (b) modern boating, (c) perennial, (d) dam-impacted, (e) special status,* and *(f) fish.* Each criterion is compared with the rest of the criteria by assigning relative numerical values based on the preference scale provided below.

Value	Degree of Preference
4	*Major Preference*
3	*Medium Preference*
2	*Minor Preference*
1	*No Preference*
	(Each criterion scores one point).

For example, if three criteria (say *X, Y,* and *Z*) are being compared for the purpose of assigning numerical weights to them, each criterion must be individually compared to each of the other criteria (say *X vs. Y, X vs. Z, and Y vs. Z*). In each comparison there are only two possible choices, i.e., either one criterion is superior or preferred over the other criterion, or both criteria are on par - that is, no criterion is superior or preferred. For the first choice (where one criterion is superior or preferred), alphanumeric ratings similar to the examples below could be used:

X4 - indicates that criterion *X* is a *major preference* over criterion *Y* or criterion *Z*, whichever criterion *X* is being compared against.

Z3 - indicates that criterion *Z* is a *medium preference* over criterion *X* or criterion *Y*, whichever criterion *Z* is being compared against.

Y2 - indicates that criterion *Y* is a *minor preference* over criterion *X* or criterion *Z*, whichever criterion *Y* is being compared against.

For the second choice (where no criterion is superior or preferred), alphanumeric ratings similar to the examples below could be used:

X,Y1 - indicates that criterion *X* and criterion *Y* are on par (no preference) assigning one point for each criterion.

Y,Z1 - indicates that criterion *Y* and criterion *Z* are on par (no preference) assigning one point for each criterion.

When all possible comparison scenarios are exhausted, the assigned numerical values are summed up for each criterion. The criterion that receives the highest total raw score should carry the highest numerical weight. Ranking all the criteria based on the raw scores evaluated, numerical weights from 0 to 10 are assigned accordingly. A numerical weight of 10 should be assigned to the criterion with the largest raw score, 9 or a lower rating to the second largest raw score, and so on.

3.2.3 CUT-OFF NUMBER FOR THE RATING SYSTEM

The selection of the cut-off number used to identify the watercourses for Level 3 analysis (NRL2 data set) is based on a combination of positive responses on the six criteria. The scenarios presented below were considered to select the cut-off number for the study. It is important to note that the criteria weights presented in Table B-1 (Appendix B) were used for these scenarios. The evaluated weights are: historical

boating = 10, modern boating = 8, perennial = 7, dam-impacted = 4, fish = 4, and special status = 2. The use of 11.0 as the cut-off number is justified as follows:

1. Watercourses must be at least perennial, with fish, and with special status to be forwarded for Level 3 analysis. Considering the weights established for the six criteria, the evaluated total rating for this combination of responses is 13.0.

2. Watercourses must be at least perennial, dam-impacted, and with special status to be forwarded for Level 3 analysis. Here, a maximum total rating of 13.0 is evaluated.

3. Watercourses with historical boating and modern boating accounts are automatically forwarded for Level 3 analysis. These watercourses are most likely to be perennial to have such boating accounts. Here, a minimum total rating of 15.0 is evaluated.

4. Watercourses with fish, dam-impacted and with special status designations are not good enough to be considered for Level 3 analysis. The total evaluated rating for this combination is 10.0.

5. Watercourses that are perennial and with fish are not good enough to be considered for Level 3 analysis. The same is true for watercourses that are perennial and dam-impacted. The total ratings evaluated for these two scenarios are 11.0.

3.3 LEVEL 3 ANALYSIS

The goal of the Level 3 sorting process is to eliminate watercourses that are non-susceptible to navigation utilizing quantitative engineering methodologies. The primary objective of the Level 3 engineering methodologies is to provide technically sound data from which typical channel characteristics and flow rates for each watercourse can be estimated and used to determine susceptibility to navigation. Additionally, any physical obstacles to successful navigation along a watercourse will be identified and assessed at Level 3.

The recommended methodologies for the Level 3 screening process involve application of quantitative hydrologic and hydraulic analyses that require a significant level of effort to meet the requirements of the adjudication process. The availability of streamgage data significantly impacts the level of effort required to quantify discharge rate and hydraulic geometry for evaluation of watercourse susceptibility to navigation. The recommended methodologies include:

1. Quantitative analysis of US Geological Survey (USGS) streamflow records or USGS regression-type methodologies based on streamflow records or extrapolation of gage data to adjacent watersheds to estimate discharge in the subject watercourse; and

2. Use of USGS rating curves or Manning's ratings to estimate flow characteristics such as depth, width and velocity in the subject watercourse.

The Level 3 screening process is applied only to those watercourses not rejected at Level 2 (NRL2 data set). The watercourses with no evidence of actual navigation in fact and determined to be not susceptible to navigation are rejected at Level 3. All remaining watercourses merit Detailed Study (Level 4) comparable to that performed for the major river studies and advance to the final level of the watercourse evaluation system.

3.4 LEVEL 3 – DETAILED STUDY SIMULTANEOUS ANALYSIS

Figure 7 shows the schematics of the procedure adopted to evaluate the small and minor watercourses that have passed the Level 2 analysis. This approach was used by the project team to meet the accelerated schedule set by ANSAC for public hearings. It was not possible to meet the ANSAC schedule and wait for the outcome of the Level 3 screening prior to knowing which watercourse would proceed to detailed studies. Since the Level 3 analysis takes significant effort (and time) to complete, and detailed studies take an even greater effort, the completion dates of the detailed studies would extend beyond the scheduled ANSAC hearings. Therefore, the need to complete all analyses for every watercourse prior to the hearing dates requires that the Level 3 analysis and the detailed studies be conducted simultaneously or in parallel track (see Figure 7). This, however, does not require every NRL2 watercourse to be studied in detail but only those that had the highest ratings in the ranking system. Although this approach effectively eliminates the scheduling problem presented above, this entails some extra cost for the engineering and analysis. It is most likely that some of the watercourses that have been studied in detail would turn up in the RL3 (rejected data set in Level 3) list after the Level 3 analysis. This RL3 data set comprises those watercourses that merit no further evaluation and study after Level 3.

The extra cost, however, is insignificant compared to the importance of meeting the goal of completing the task within the allotted time frame. It is critical that the cases of all the small and minor watercourses in the fifteen counties of Arizona are heard and fully adjudicated before the Commission sunset date of June 30, 2002.

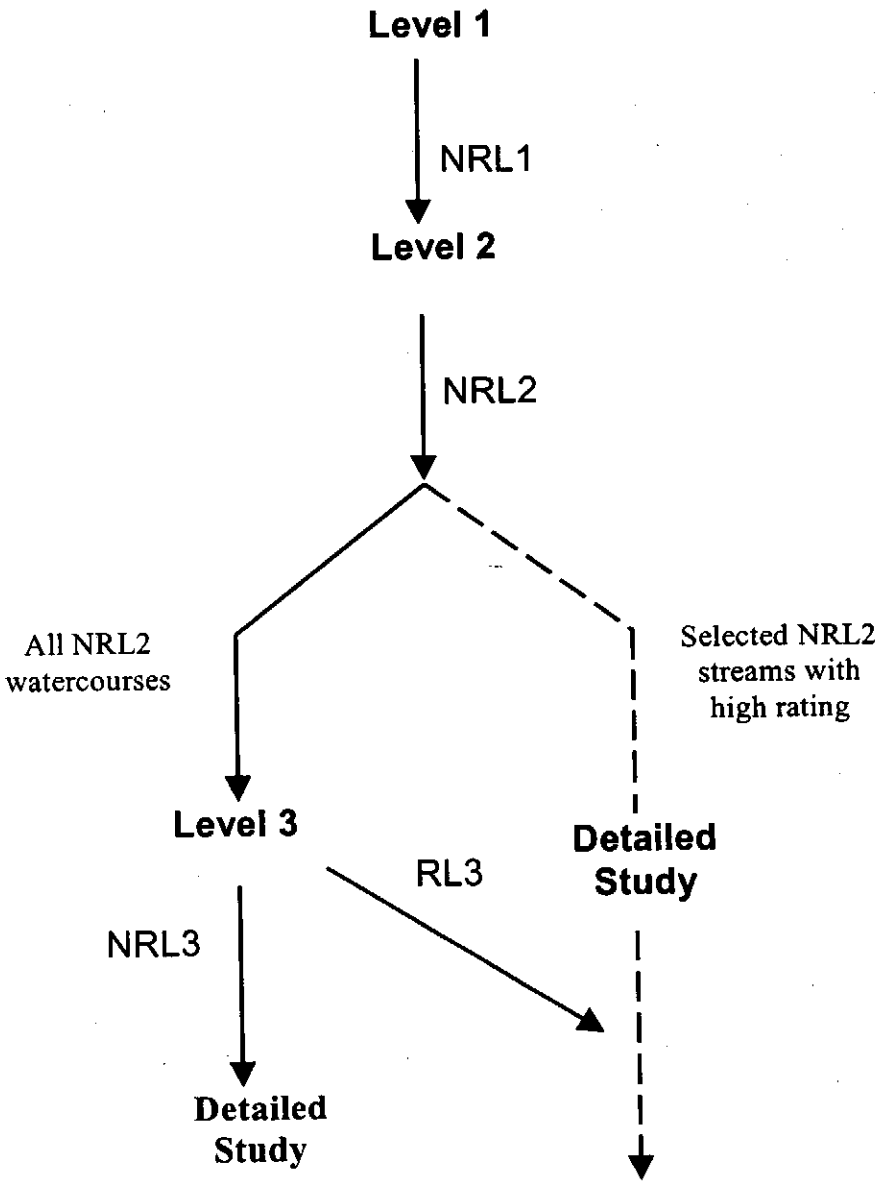


Figure 7
Schematics showing simultaneous analysis of
selected NRL2 watercourses in Level 3 and Detailed Study

4.0 Results

4.1 LEVEL 1 ANALYSIS

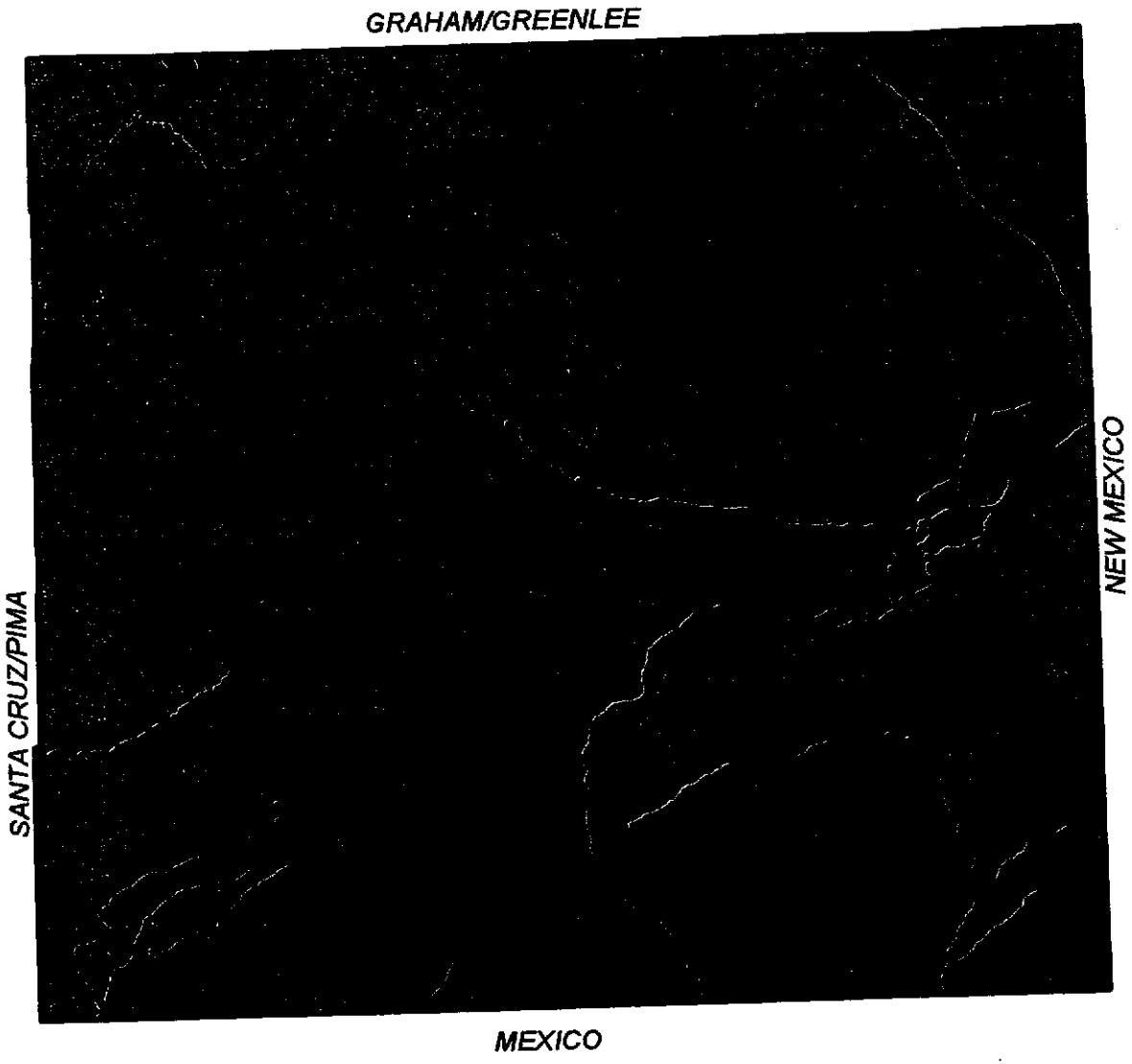
The application of the Level 1 sorting procedure to all small and minor watercourses in Cochise County resulted into two data sets. The RL1 data set is comprised of all watercourses that test negatively for each criterion used in the Level 1 database query. This indicates that no characteristics of stream susceptibility to navigation are exhibited based upon known records and information. Level 1 analysis results indicate a significant percentage of the watercourses (97.6% or 1,698 records out of 1,739 total) test negatively to all Level 1 criteria and, therefore, do not justify further evaluation at Level 2.

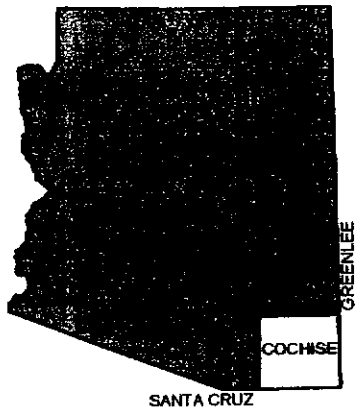
The NLR1 data set is comprised of those watercourses that exhibit some characteristics of susceptibility to navigation based upon at least one affirmative response (hit) to the six criteria used in the Level 1 evaluation. Results of the analysis indicate that there are 41 watercourses (approximately 2.4%) in Cochise County, which justify analysis at Level 2.

The summary listings for RL1 and NRL1 data sets are presented in Tables A-1A and A-1B in Appendix A. Twenty-six (26) of the NRL1 watercourses are one-hitters and 15 watercourses tested affirmatively to more than one of the Level 1 criteria used in the database query.

The maps of RL1 and NRL1 data sets determined from the Level 1 sort are shown in Figure 8.

FIGURE 8
NRL1 and RL1 Data Sets from Level 1 Analysis for Cochise County





Arizona Map

LEGEND:

NRL1 Data Set

RL1 Data Set

Cochise County

N
W
E
S

10 0 10 20 30 Miles

4.2 LEVEL 2 ANALYSIS

The NRL1 data set resulting from Level 1 analysis contains 41 watercourses. Results from the application of the Level 2 approach to the 41 watercourses are presented and discussed in the sections that follow. Employing the first-cut screening process shown in Figure 5 for the NRL1 data set leads to the classification of the watercourses as follows:

1. Stream *Category B* – navigation possible, not likely.

    a. Babocomari River – Cochise
    b. Bass Canyon
    c. Cave Creek – Cochise
    d. Hot Springs Canyon
    e. Leslie Creek
    f. Morse Canyon
    g. Parker Canyon
    h. Ramsey Canyon
    i. Redfield Canyon
    j. Rucker canyon
    k. South Fork Cave Creek
    l. Swamp Springs Canyon
    m. Turkey Creek – Cochise
    n. Turkey Creek – Cochise/Santa Cruz
    o. Whitewater Draw

2. Stream Category C – navigation unlikely.

    a. Bear Creek - Cochise
    b. Black Draw
    c. Cottonwood Draw
    d. East Turkey Creek
    e. Garden Canyon
    f. Joaquin Creek
    g. Miller Canyon
    h. Mulberry Draw
    i. San Simon River
    j. 17 unnamed washes

Employing the second-cut filter screening process shown in Figure 6 and the criteria scoring matrix presented in Figure B-1 (see Appendix B) to establish a ranking system for the watercourses leads to the identification of a cut-off number that separates those watercourses rejected at Level 2 and those that are forwarded for Level 3 analysis. All watercourses with total ratings equal to or lesser than the cut-off number of 11.0 are classified under *Category C*. These watercourses comprise the RL2 data

set, which are not forwarded for Level 3 analysis. On the other hand, the watercourses with total ratings more than the cut-off number of 11.0 are classified under *Category A*. These watercourses comprise those that are potentially susceptible to navigation and hence, are forwarded for Level 3 analysis.

To illustrate the use of the numerical weights for the refined approach, the case of Morse Canyon in Cochise County is considered (see Table A-2C, Appendix A). From the database, Morse Canyon exhibits the information shown in Table 2 [column (4)] on the six criteria. The rating of 1.0 for perennial is evaluated from the fact that Morse Canyon is perennial according to ALRIS (1999) and Brown et al. (1981). The rating of 1.0 for fish is evaluated from the fact that both native and non-native fish species are documented for Morse Canyon. Weights given to fish species are: 0.75 for native fish and 0.25 for non-native species. A total weight of 1.0 for fish is evaluated from the sum of these two weights.

Table 2
Evaluation of Total Rating

Criterion	Weights	Rating	Refined Rating	Notes/ Remarks
(2)	(3)	(4)	(5) = (3)x(4)	(6)
Perennial	7	1.00	7.00	Stream is perennial.
Historical Boating	10	0.00	0.00	No historical boating.
Modern Boating	8	0.00	0.00	No modern boating.
Dam-Impacted	4	0.00	0.00	Not dam-impacted.
Fish	4	1.00	4.00	Native and non-native fish species are present.
Special Status	2	0.00	0.00	No special status.
Total Rating		2.00	11.00	Cut-off number

From the analysis performed in Table 2, the total rating evaluated for Morse Canyon is 11.0 which is the cut-off number. This indicates that Morse Canyon is not forwarded for Level 3 analysis.

The listing of watercourses classified under stream *Category A* and *Category C* for the second cut filter screening process are provided as follows:

3. Stream *Category A* – potentially susceptible to navigation.

   [No Category B watercourse qualifies to be classified under Category A as the maximum total rating evaluated for the watercourses is 11.0].

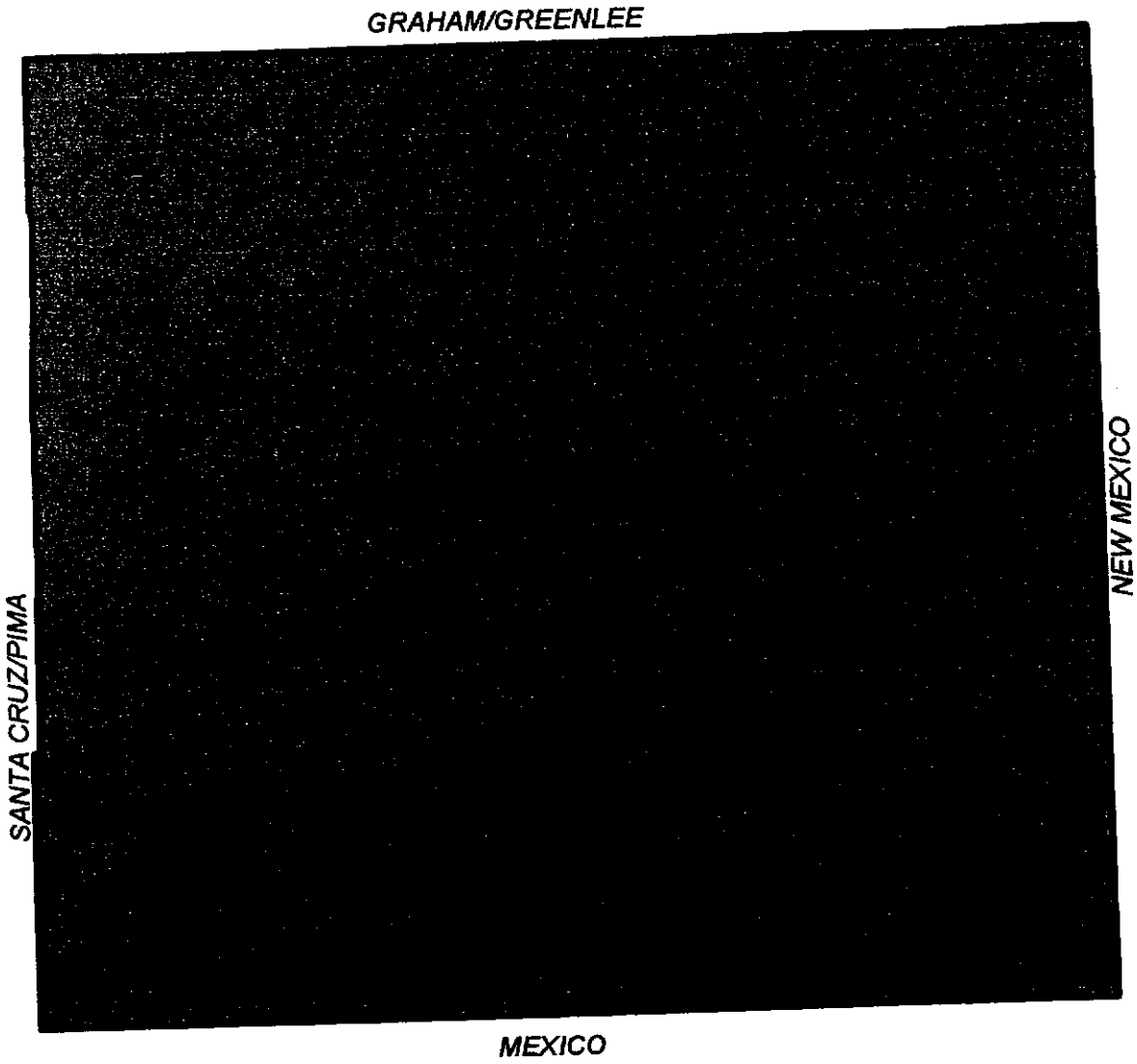
4. Stream Category C – navigation unlikely.

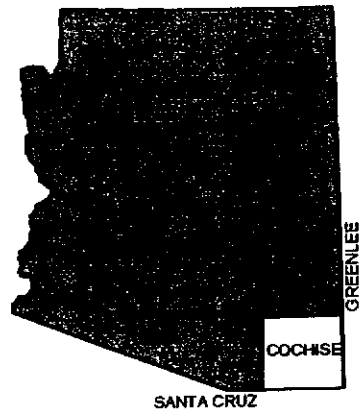
   a. Babocomari River – Cochise
   b. Bass Canyon
   c. Cave Creek – Cochise
   d. Hot Springs Canyon
   e. Leslie Creek
   f. Morse Canyon
   g. Parker Canyon
   h. Ramsey Canyon
   i. Redfield Canyon
   j. Rucker canyon
   k. South Fork Cave Creek
   l. Swamp Springs Canyon
   m. Turkey Creek – Cochise
   n. Turkey Creek – Cochise/Santa Cruz
   o. Whitewater Draw

A summary listing of the RL2 data set is presented in Tables A-2A (see Appendix A). The map associated with the RL2 data set evaluated from Level 2 is shown in Figure 9.

The numerical weights assigned to the six criteria were based on the average values evaluated from the use of the criteria scoring matrix. This numerical weights are used as multipliers for the six criteria in calculating the total rating associated with each watercourse. The summary table listing the numerical weights assigned to the six criteria from a pool of seven participants is shown in Table B-1 (see Appendix B - Criteria Weight Evaluation).

FIGURE 9
NRL2 and RL2 Data Sets from Level 2 Analysis for Cochise County





Arizona Map

LEGEND:

NRL2 Data Set

RL2 Data Set

Cochise County

N
W
E
S

10 0 10 20 30 Miles

4.3 LEVEL 3 ANALYSIS

No watercourse in Cochise County passed the Level 2 analysis (i.e., NRL2 data set) therefore no Level 3 analysis was performed.

4.4 DETAILED STUDY

There are no watercourses in Cochise County that merit a detailed study.

5.0 Conclusions and Recommendations

- The Level 1 analysis performed for the watercourses in Cochise County resulted in two data sets. Out of a total of 1,739 watercourses identified, there are 1698 that were classified under RL1 and 41 that were classified under NRL1. The lists of both data sets are provided in Appendix A.

- The qualitative approach employed in the Level 2 analysis for the NRL1 data set resulted in initially sorting watercourses into *Category B and Category C*. No watercourse qualified to be classified under *Category A*. The second-cut filter and the use of the criteria weights resulted in refining the screening of watercourses in *Category B*. Ultimately, Level 2 analysis results indicate that all the 41 watercourses merit no further evaluation and analysis in Level 3.

- No watercourse in Cochise County reached Level 3 analysis and none is recommended for detailed study.

6.0 References

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TABLE A-1A
RL1 Watercourses for Cochise County

No. (1)	W_ID (2)	W_NAME (3)	SEGCOUNT (4)	W_COUNTIES (5)	W_MILES (6)	W_ADDRESS (7)	W_PER (8)	W_MBOAT (9)	W_HBOAT (10)	W_FISH (11)	W_DIMP (12)	W_SSTATUS (13)	HITS (14)
1	56	Apache Canyon Stream	2	Cochise/Pima	8.8835	T18.0S,R18.0E,S07	No	No	No	No	No	No	0
2	76	Ash Creek 1 - Cochise	6	Cochise	16.6219	T18.0S,R26.0E,S24	No	No	No	No	No	No	0
3	80	Ash Creek 1 - Pima/Cochise	5	Pima/Cochise	5.2923	T16.0S,R19.0E,S06	No	No	No	No	No	No	0
4	82	Ash Creek 2 - Cochise	17	Cochise	9.2036	T16.0S,R19.0E,S08	No	No	No	No	No	No	0
5	89	Ash Creek 3 - Graham	10	Graham/Cochise	25.3967	T10.0S,R22.0E,S36	No	No	No	No	No	No	0
6	92	Ash Creek Canyon	3	Cochise	9.9756	T13.0S,R22.0E,S26	No	No	No	No	No	No	0
7	120	Banning Creek	12	Cochise	14.1748	T22.0S,R23.0E,S21	No	No	No	No	No	No	0
8	140	Bear Creek 1 - Cochise	2	Pima/Cochise	9.0827	T14.0S,R19.0E,S29	No	No	No	No	No	No	0
9	158	Bee Canyon Wash	2	Cochise	5.9401	T13.0S,R23.0E,S09	No	No	No	No	No	No	0
10	171	Big Bend Creek	8	Cochise	10.3035	T21.0S,R28.0E,S22	No	No	No	No	No	No	0
11	186	Big Sand Wash - Cochise	2	Cochise	3.0331	T16.0S,R28.0E,S01	No	No	No	No	No	No	0
12	206	Bitter Creek - Cochise	1	Cochise	1.0856	T15.0S,R30.0E,S31	No	No	No	No	No	No	0
13	239	Blacktail Wash	3	Cochise	9.5572	T21.0S,R19.0E,S01	No	No	No	No	No	No	0
14	286	Box Spring Creek	4	Cochise/Graham	13.7030	T11.0S,R22.0E,S18	No	No	No	No	No	No	0
15	288	Brad Creek	1	Cochise	2.0607	T15.0S,R30.0E,S20	No	No	No	No	No	No	0
16	304	Brushy Creek - Cochise	3	Cochise	6.2082	T19.0S,R29.0E,S26	No	No	No	No	No	No	0
17	309	Buck Creek	2	Cochise	10.9847	T22.0S,R30.0E,S17	No	No	No	No	No	No	0
18	354	Cadillac Wash	2	Cochise	9.3191	T16.0S,R20.0E,S32	No	No	No	No	No	No	0
19	358	California Wash	1	Cochise	7.6152	,,SLG	No	No	No	No	No	No	0
20	447	Cherry Spring Canyon	7	Cochise	9.6717	T12.0S,R19.0E,S23	No	No	No	No	No	No	0
21	486	Clifford Wash	9	Cochise	18.5909	,,SLG	No	No	No	No	No	No	0
22	503	Collins Wash	1	Cochise	2.1712	T14.0S,R19.0E,S15	No	No	No	No	No	No	0
23	545	Cottonwood Creek 1 - Cochise	1	Cochise	2.1041	T15.0S,R30.0E,S30	No	No	No	No	No	No	0
24	549	Cottonwood Creek 2 - Cochise	5	Cochise	7.4239	T22.0S,R32.0E,S27	No	No	No	No	No	No	0
25	553	Cottonwood Creek 3 - Cochise	1	Cochise	5.6369	T19.0S,R29.0E,S27	No	No	No	No	No	No	0
26	615	Danger Wash	2	Cochise	7.6561	T22.0S,R30.0E,S19	No	No	No	No	No	No	0
27	639	Deer Creek 1 - Cochise	2	Cochise	2.5637	T20.0S,R32.0E,S27	No	No	No	No	No	No	0
28	643	Deer Creek 1 - Pima/Cochise	5	Pima/Cochise	7.7186	T14.0S,R19.0E,S20	No	No	No	No	No	No	0
29	658	Dial Wash	3	Cochise/Graham	16.3473	T11.0S,R28.0E,S31	No	No	No	No	No	No	0
30	679	Dragoon Wash	16	Cochise	20.3956	T17.0S,R21.0E,S31	No	No	No	No	No	No	0
31	733	East Whitetail Creek	17	Cochise	20.2668	T16.0S,R30.0E,S25	No	No	No	No	No	No	0
32	748	Escalante Wash	2	Cochise	8.8439	T18.0S,R21.0E,S16	No	No	No	No	No	No	0
33	770	Fivemile Creek	4	Cochise	16.9082	T17.0S,R28.0E,S15	No	No	No	No	No	No	0
34	811	Gadwell Canyon	10	Cochise	19.5608	T21.0S,R24.0E,S10	No	No	No	No	No	No	0
35	829	Glance Creek	9	Cochise	10.9687	T24.0S,R25.0E,S04	No	No	No	No	No	No	0
36	831	Gold Gulch	25	Cochise/Graham	32.2825	T10.0S,R28.0E,S33	No	No	No	No	No	No	0
37	881	Guadalupe Canyon	9	Cochise	7.8690	T24.0S,R32.0E,S21	No	No	No	No	No	No	0
38	37602	Haberstock Wash	2	Cochise	6.9397	T19.0S,R22.0E,S11	No	No	No	No	No	No	0
39	37608	Hackberry Wash - Cochise	3	Cochise	6.2530	T22.0S,R29.0E,S35	No	No	No	No	No	No	0
40	37624	Happy Camp Wash	8	Cochise	16.8805	T13.0S,R28.0E,S25	No	No	No	No	No	No	0
41	37641	Hay Hollow Wash	4	Cochise	12.9276	T23.0S,R31.0E,S23	No	No	No	No	No	No	0
42	37648	Henderson Wash	2	Cochise	7.2643	T19.0S,R22.0E,S24	No	No	No	No	No	No	0
43	37717	Indian Creek 1 - Cochise	8	Cochise	18.9735	T23.0S,R30.0E,S18	No	No	No	No	No	No	0
44	37719	Indian Creek 2 - Cochise	2	Cochise	3.6409	T16.0S,R30.0E,S20	No	No	No	No	No	No	0
45	37785	Keating Creek	4	Cochise	8.6647	T16.0S,R30.0E,S12	No	No	No	No	No	No	0

TABLE A-1A
RL1 Watercourses for Cochise County

No. (1)	W_ID (2)	W_NAME (3)	SEGCOUNT (4)	W_COUNTIES (5)	W_MILES (6)	W_ADDRESS (7)	W_PER (8)	W_MBOAT (9)	W_HBOAT (10)	W_FISH (11)	W_DIMP (12)	W_SSTATUS (13)	HITS (14)
46	37955	Mesa Draw	7	Cochise	10.3054	T21.0S,R28.0E,S22	No	No	No	No	No	No	0
47	37958	Mescal Arroyo	6	Pima/Cochise	9.2571	T17.0S,R18.0E,S03	No	No	No	No	No	No	0
48	37959	Mescal Creek - Cochise	3	Cochise	5.3028	T19.0S,R19.0E,S33	No	No	No	No	No	No	0
49	37967	Middle Canyon Wash	1	Cochise	5.0489	T18.0S,R20.0E,S32	No	No	No	No	No	No	0
50	37974	Middle Witch Creek	1	Cochise	2.0537	T17.0S,R29.0E,S19	No	No	No	No	No	No	0
51	38014	Montosa Canyon	2	Pima/Cochise	6.7310	T18.0S,R18.0E,S21	No	No	No	No	No	No	0
52	38035	Mud Spring Wash	2	Cochise/Graham	8.0779	T11.0S,R22.0E,S14	No	No	No	No	No	No	0
53	38100	North Witch Creek	2	Cochise	3.9859	T17.0S,R29.0E,S19	No	No	No	No	No	No	0
54	38105	O B Draw	3	Cochise	7.9798	T16.0S,R28.0E,S04	No	No	No	No	No	No	0
55	38109	Oak Creek - Cochise	2	Cochise	3.8614	T16.0S,R30.0E,S23	No	No	No	No	No	No	0
56	38127	Onion Creek	2	Cochise	2.8245	T17.0S,R30.0E,S25	No	No	No	No	No	No	0
57	38137	Owl Creek	2	Cochise	3.4577	T20.0S,R32.0E,S20	No	No	No	No	No	No	0
58	38143	Pacheco Wash	2	Cochise	6.9414	T16.0S,R20.0E,S06	No	No	No	No	No	No	0
59	38151	Paige Creek	27	Pima/Cochise	17.6841	T13.0S,R19.0E,S23	No	No	No	No	No	No	0
60	38160	Palomas Wash	5	Cochise	7.7640	T14.0S,R20.0E,S17	No	No	No	No	No	No	0
61	38216	Pine Creek - Cochise	5	Cochise	15.6040	T17.0S,R30.0E,S32	No	No	No	No	No	No	0
62	38230	Pinery Creek	10	Cochise	22.5847	T16.0S,R28.0E,S22	No	No	No	No	No	No	0
63	38259	Pool Wash	3	Cochise	5.6669	T13.0S,R19.0E,S25	No	No	No	No	No	No	0
64	38273	Pridham Creek	4	Cochise	13.6684	T18.0S,R27.0E,S25	No	No	No	No	No	No	0
65	38330	Redrock Creek	10	Cochise	9.8588	T15.0S,R20.0E,S04	No	No	No	No	No	No	0
66	38331	Reeves Creek	3	Cochise	9.0578	T20.0S,R23.0E,S05	No	No	No	No	No	No	0
67	38334	Reiley Creek	2	Cochise	7.7313	T11.0S,R23.0E,S32	No	No	No	No	No	No	0
68	38339	Ridge	1	Cochise	10.4132	T15.0S,R26.0E,S21	No	No	No	No	No	No	0
69	38356	Rock Creek - Cochise	3	Cochise	14.9889	T18.0S,R28.0E,S09	No	No	No	No	No	No	0
70	38390	Sacaton Wash	2	Cochise	6.3199	T12.0S,R25.0E,S09	No	No	No	No	No	No	0
71	38477	Sheep Wash - Cochise	13	Cochise	10.9688	T16.0S,R22.0E,S18	No	No	No	No	No	No	0
72	38502	Silver Creek 1 - Cochise	14	Cochise	18.0801	T24.0S,R30.0E,S17	No	No	No	No	No	No	0
73	38503	Silver Creek 2 - Cochise	3	Cochise	14.2734	T16.0S,R32.0E,S26	No	No	No	No	No	No	0
74	38518	Slaughterhouse Wash	3	Cochise	8.0780	T21.0S,R20.0E,S06	No	No	No	No	No	No	0
75	38519	Slavin Wash	8	Cochise	15.5599	T18.0S,R21.0E,S17	No	No	No	No	No	No	0
76	38540	Soldier Creek - Cochise	4	Cochise	13.3633	T22.0S,R20.0E,S04	No	No	No	No	No	No	0
77	38558	South Fork Canyon	1	Cochise	1.8877	T13.0S,R22.0E,S26	No	No	No	No	No	No	0
78	38566	South Fork Keating Creek	1	Cochise	3.0214	T16.0S,R30.0E,S14	No	No	No	No	No	No	0
79	38581	South Witch Creek	1	Cochise	4.0104	T17.0S,R29.0E,S19	No	No	No	No	No	No	0
80	38583	Soza Wash	16	Cochise	10.8187	T12.0S,R19.0E,S29	No	No	No	No	No	No	0
81	38590	Spring Creek - Cochise	4	Cochise	9.0321	T23.0S,R22.0E,S15	No	No	No	No	No	No	0
82	38612	Stanford Creek	2	Cochise	13.2640	T18.0S,R27.0E,S23	No	No	No	No	No	No	0
83	38648	Sycamore Creek - Cochise	3	Cochise	5.6937	T23.0S,R32.0E,S10	No	No	No	No	No	No	0
84	38689	Teran Wash	10	Cochise	7.0686	T13.0S,R20.0E,S31	No	No	No	No	No	No	0
85	38737	Tres Alamos Wash	29	Cochise	28.4659	T16.0S,R20.0E,S05	No	No	No	No	No	No	0
86	38808	Vanar Wash	9	Cochise	10.5214	T13.0S,R32.0E,S11	No	No	No	No	No	No	0
87	38832	Walnut Gulch	10	Cochise	12.1723	,,SLG	No	No	No	No	No	No	0
88	38833	Walnut Wash	6	Cochise	10.5341	T15.0S,R24.0E,S19	No	No	No	No	No	No	0
89	38879	West Whitetail Creek	7	Cochise	8.7334	T16.0S,R29.0E,S15	No	No	No	No	No	No	0
90	38912	Wildcat Wash	1	Cochise	6.5997	T24.0S,R30.0E,S08	No	No	No	No	No	No	0

TABLE A-1A
RL1 Watercourses for Cochise County

No. (1)	W_ID (2)	W_NAME (3)	SEGCOUNT (4)	W_COUNTIES (5)	W_MILES (6)	W_ADDRESS (7)	W_PER (8)	W_MBOAT (9)	W_HBOAT (10)	W_FISH (11)	W_DIMP (12)	W_SSTATUS (13)	HITS (14)
91	38932	Willow Wash - Cochise	8	Cochise	19.2051	,,SLG	No	No	No	No	No	No	0
92	38937	Witch Creek	1	Cochise	2.7809	T17.0S,R28.0E,S15	No	No	No	No	No	No	0
93	38940	Wood Canyon Stream	8	Cochise	10.3409	T15.0S,R30.0E,S30	No	No	No	No	No	No	0
94	38943	Wood Canyon Wash	3	Cochise	5.2289	T12.0S,R23.0E,S26	No	No	No	No	No	No	0
95	38986	a - Seg 3 Cochise	5	Cochise	18.6128	T23.0S,R27.0E,S28	No	No	No	No	No	No	0
96	38991	a - Seg 7 Cochise	7	Cochise	17.4819	T21.0S,R21.0E,S11	No	No	No	No	No	No	0
97	39009	b - Seg 8 Cochise	5	Cochise	17.5033	T20.0S,R26.0E,S32	No	No	No	No	No	No	0
98-1698	—	1601 Unnamed watercourses	—	Cochise	Varies	Varies	No	No	No	No	No	No	0

NOTES: The column headings are identified as follows:

W_ID:	Unique ID number given to the watercourse.
W_NAME:	Name of the watercourse.
SEGCOUNT:	Number of segments merged together to comprise the watercouse.
W_COUNTIES:	County(ies) where the watercourse is located.
W_MILES:	Length of the watercourse in miles.
W_ADDRESS:	Township, Range and Section of the mouth of the watercourse.
W_PER:	Stream classification- perennial or not.
W_MBOAT:	With modern boating or not.
W_HBOAT:	With historical boating or not.
W_FISH:	With fish or not.
W_DIMP:	Impacted by dam or not.
W_SSTATUS:	With special status designation or not.
HITS:	Number of affirmative hits based on the six attribute data.

TABLE A-1B
NRL1 Watercourses for Cochise County

No. (1)	W_ID (2)	W_NAME (3)	SEGCOUNT (4)	W_COUNTIES (5)	W_MILES (6)	W_ADDRESS (7)	W_PER (8)	W_MBOAT (9)	W_HBOAT (10)	W_FISH (11)	W_SSTATUS (12)	W_DIMP (13)	HITS (14)
1	37832	Leslie Creek	4	Cochise	14.0590	T22.0S,R26.0E,S11	Yes	No	No	Yes	Yes	Yes	4
2	38642	Swamp Springs Canyon	4	Cochise/Graham	5.6999	T11.0S,R20.0E,S32	Yes	No	No	Yes	Yes	No	3
3	402	Cave Creek - Cochise	13	Cochise	17.5340	T18.0S,R31.0E,S09	Yes	No	No	Yes	Yes	No	3
4	38378	Rucker Canyon	10	Cochise	10.4054	T19.0S,R29.0E,S24	No	No	No	Yes	Yes	Yes	3
5	38559	South Fork Cave Creek	6	Cochise	8.0865	T18.0S,R31.0E,S09	Yes	No	No	Yes	Yes	No	3
6	37692	Hot Springs Canyon	20	Cochise	25.9097	T13.0S,R19.0E,S23	Yes	No	No	Yes	Yes	No	3
7	107	Babocomari River - Cochise	12	Cochise	20.0806	,,SLG	Yes	No	No	Yes	Yes	No	3
8	132	Bass Canyon	1	Cochise/Graham	6.1781	T12.0S,R21.0E,S08	No	No	No	Yes	Yes	No	3
9	38326	Redfield Canyon	22	Graham/Cochise/Pima	24.3009	T12.0S,R18.0E,S02	Yes	No	No	Yes	Yes	No	3
10	38027	Morse Canyon	4	Cochise	2.9672	T18.0S,R29.5E,S13	Yes	No	No	Yes	No	No	2
11	38771	Turkey Creek - Cochise	12	Cochise	35.6404	T16.0S,R25.0E,S32	Yes	No	No	Yes	No	No	2
12	38900	Whitewater Draw	35	Cochise	57.9517	T19.0S,R28.0E,S30	Yes	No	No	Yes	No	No	2
13	38774	Turkey Creek - Cochise/Santa Cruz	8	Santa Cruz/Cochise	17.2469	,,SLG	Yes	No	No	Yes	No	No	2
14	37398	Ramsey Canyon	2	Cochise	13.2821	T22.0S,R22.0E,S19	Yes	No	No	No	Yes	No	2
15	36134	Parker Canyon	1	Santa Cruz/Cochise	1.5568	T23.0S,R18.0E,S24	Yes	No	No	No	No	Yes	2
16	729	East Turkey Creek	8	Cochise	13.5866	T16.0S,R31.0E,S36	Yes	No	No	No	No	No	1
17	20378	H46_0854	4	Cochise	2.4674	T18.0S,R31.0E,S08	Yes	No	No	No	No	No	1
18	20384	H46_0861	2	Cochise	3.6552	T18.0S,R31.0E,S07	Yes	No	No	No	No	No	1
19	37461	H84_0470	1	Cochise	0.1757	,,SLG	Yes	No	No	No	No	No	1
20	37476	H84_0485	2	Cochise	0.2080	,,SLG	Yes	No	No	No	No	No	1
21	138	Bear Creek - Cochise	5	Cochise	7.0411	,,S90	No	No	No	Yes	No	No	1
22	557	Cottonwood Draw	1	Cochise	10.5432	T24.0S,R30.0E,S11	No	No	No	Yes	No	No	1
23	22314	H54_0055	1	Cochise	4.8634	T21.0S,R28.0E,S15	No	No	No	No	No	Yes	1
24	22516	H54_0277	3	Cochise	7.7073	T19.0S,R28.0E,S34	No	No	No	No	No	Yes	1
25	22536	H54_0301	1	Cochise	3.2658	T19.0S,R29.0E,S19	No	No	No	No	No	Yes	1
26	37426	H84_0433	4	Cochise	6.9469	T24.0S,R24.0E,S18	No	No	No	No	No	Yes	1
27	38417	San Simon River	100	Cochise/Graham	78.2251	T13.0S,R31.0E,S32	No	No	No	No	No	Yes	1
28	221	Black Draw	9	Cochise	19.5372	T24.0S,R30.0E,S11	Yes	No	No	No	No	No	1
29	20375	H46_0849	2	Cochise	3.1318	T17.0S,R31.0E,S25	Yes	No	No	No	No	No	1
30	20385	H46_0862	2	Cochise	3.1030	T18.0S,R30.0E,S13	Yes	No	No	No	No	No	1
31	20390	H46_0867	3	Cochise	2.1772	T18.0S,R31.0E,S20	Yes	No	No	No	No	No	1
32	20391	H46_0868	1	Cochise	0.9289	T18.0S,R31.0E,S20	Yes	No	No	No	No	No	1
33	22525	H54_0289	5	Cochise	5.8738	T19.0S,R30.0E,S19	No	No	No	No	No	Yes	1
34	22529	H54_0293	2	Cochise	3.2363	T19.0S,R30.0E,S18	Yes	No	No	No	No	No	1
35	37092	H84_0040	1	Cochise	0.0784	T16.0S,R20.0E,S08	Yes	No	No	No	No	No	1
36	38040	Mulberry Draw	16	Cochise	19.9950	T23.0S,R31.0E,S18	Yes	No	No	No	No	No	1
37	37758	Joaquin Creek	2	Cochise	8.1717	T24.0S,R19.0E,S13	No	No	No	Yes	No	No	1
38	37988	Miller Canyon	2	Cochise	14.1268	T13.0N,R10.0E,S01	Yes	No	No	No	No	No	1
39	37234	Garden Canyon	7	Cochise	12.0446	T22.0S,R21.0E,S18	Yes	No	No	No	No	No	1
40	22339	H54_0081	1	Cochise	1.1287	T23.0S,R24.0E,S14	No	No	No	No	No	Yes	1
41	22637	H55_0105	3	Cochise	6.1509	T24.0S,R30.0E,S17	No	No	No	No	No	Yes	1

NOTES: The column headings are identified as follows:

W_ID: Unique ID number given to the watercourse.
W_NAME: Name of the watercourse.
SEGCOUNT: Number of segments merged together to comprise the watercouse.
W_COUNTIES: County(ies) where the watercourse is located.
W_MILES: Length of the watercourse in miles.
W_ADDRESS: Township, Range and Section of the mouth of the watercourse.
W_PER: Stream classification- perennial or not.
W_MBOAT: With modern boating or not.
W_HBOAT: With historical boating or not.
W_FISH: With fish or not.
W_DIMP: Impacted by dam or not.
W_SSTATUS: With special status designation or not.
HITS: Number of affirmative hits based on the six attribute data.

Table A-2A
RL2 Watercourses for Cochise County

NO (1)	W_ID (2)	W_NAME (3)	SEGCOUNT (4)	W_COUNTIES (5)	W_MILES (6)	W_ADDRESS (7)	L1_PER (8)	L2_PER (9)	L2_MBOAT (10)	L2_HBOAT (11)	L2_DIMP (12)	L2_FISH (13)	L2_SSTATUS (14)	NEW_RAT (15)
1	38027	Morse Canyon	4	Cochise	2.9672	T18.0S,R29.5E,S13	Yes	Yes	No	No	No	Yes	No	11.00
2	38326	Redfield Canyon	22	Cochise/GrahamPima	24.3009	T12.0S,R18.0E,S02	Yes	Yes	No	No	No	Yes	Yes	10.88
3	38642	Swamp Springs Canyon	4	Cochise/Graham	5.6999	T11.0S,R20.0E,S32	Yes	Yes	No	No	No	Yes	Yes	10.88
4	402	Cave Creek - Cochise	13	Cochise	17.5340	T18.0S,R31.0E,S09	Yes	Yes	No	No	No	Yes	Yes	10.26
5	38559	South Fork Cave	6	Cochise	8.0865	T18.0S,R31.0E,S09	Yes	Yes	No	No	No	Yes	Yes	10.26
6	38771	Turkey Creek - Cochise	12	Cochise	35.6404	T16.0S,R25.0E,S32	Yes	Yes	No	No	No	Yes	No	10.00
7	107	Babocomari River - Cochise	12	Cochise	20.0806	,,SLG	No	No/Yes	No	No	No	Yes	Yes	8.38
8	37692	Hot Springs Canyon	20	Cochise	25.9097	T13.0S,R19.0E,S23	Yes	Yes/No	No	No	No	Yes	Yes	8.26
9	38134	Parker Canyon	1	Cochise/Santa Cruz	1.5568	T23.0S,R18.0E,S24	No	No/Yes	No	No	Yes	No	No	7.50
10	38900	Whitewater Draw	35	Cochise	57.9517	T19.0S,R28.0E,S30	Yes	Yes/No	No	No	No	Yes	No	7.50
11	729	East Turkey Creek	8	Cochise	13.5866	T16.0S,R31.0E,S36	Yes	Yes	No	No	No	No	No	7.00
12	20378	H46_0854	4	Cochise	2.4674	T18.0S,R31.0E,S08	Yes	Yes	No	No	No	No	No	7.00
13	20384	H46_0861	2	Cochise	3.6552	T18.0S,R31.0E,S07	Yes	Yes	No	No	No	No	No	7.00
14	37461	H84_0470	1	Cochise	0.1757	,,SLG	Yes	Yes	No	No	No	No	No	7.00
15	37476	H84_0485	2	Cochise	0.2080	,,SLG	Yes	Yes	No	No	No	No	No	7.00
16	37398	Ramsey Canyon	2	Cochise	13.2821	T22.0S,R22.0E,S19	No	No/Yes	No	No	No	No	Yes	5.26
17	132	Bass Canyon	1	Cochise/Graham	6.1781	T12.0S,R21.0E,S08	No	No	No	No	No	Yes	Yes	4.76
18	37832	Leslie Creek	4	Cochise	14.0590	T22.0S,R26.0E,S11	No	No	No	No	No	Yes	Yes	4.76
19	38378	Rucker Canyon	10	Cochise	10.4054	T19.0S,R29.0E,S24	No	No	No	No	No	Yes	Yes	4.26
20	138	Bear Creek - Cochise	5	Cochise	7.0411	,,S90	No	No	No	No	No	Yes	No	4.00
21	557	Cottonwood Draw	1	Cochise	10.5432	T24.0S,R30.0E,S11	No	No	No	No	No	Yes	No	4.00
22	22314	H54_0055	1	Cochise	4.8634	T21.0S,R28.0E,S15	No	No	No	No	Yes	No	No	4.00
23	22516	H54_0277	3	Cochise	7.7073	T19.0S,R28.0E,S34	No	No	No	No	Yes	No	No	4.00
24	22536	H54_0301	1	Cochise	3.2658	T19.0S,R29.0E,S19	No	No	No	No	Yes	No	No	4.00
25	37426	H84_0433	4	Cochise	6.9469	T24.0S,R24.0E,S18	No	No	No	No	Yes	No	No	4.00
26	38417	San Simon River	100	Cochise/Graham	78.2251	T13.0S,R31.0E,S32	No	No	No	No	Yes	No	No	4.00
27	37234	Garden Canyon	7	Cochise	12.0446	,,SLG	No	No/Yes	No	No	No	No	Yes	3.88
28	221	Black Draw	9	Cochise	19.5372	T24.0S,R30.0E,S11	No	No/Yes	No	No	No	No	No	3.50
29	20375	H46_0849	2	Cochise	3.1318	T17.0S,R31.0E,S25	Yes	Yes/No	No	No	No	No	No	3.50
30	20385	H46_0862	2	Cochise	3.1030	T18.0S,R30.0E,S13	Yes	Yes/No	No	No	No	No	No	3.50
31	20390	H46_0867	3	Cochise	2.1772	T18.0S,R31.0E,S20	Yes	Yes/No	No	No	No	No	No	3.50
32	20391	H46_0868	1	Cochise	0.9289	T18.0S,R31.0E,S20	Yes	Yes/No	No	No	No	No	No	3.50
33	22525	H54_0289	5	Cochise	5.8738	T19.0S,R30.0E,S19	Yes	Yes/No	No	No	No	No	No	3.50
34	22529	H54_0293	2	Cochise	3.2363	T19.0S,R30.0E,S18	Yes	Yes/No	No	No	No	No	No	3.50
35	37092	H84_0040	1	Cochise	0.0784	T16.0S,R20.0E,S08	Yes	Yes/No	No	No	No	No	No	3.50
36	38040	Mulberry Draw	16	Cochise	19.9950	T23.0S,R31.0E,S18	Yes	Yes/No	No	No	No	No	No	3.50
37	37758	Joaquin Creek	2	Cochise	8.1717	T24.0S,R19.0E,S13	No	No	No	No	No	Yes	No	3.00
38	38774	Turkey Creek - Cochise/Sta. Cruz	8	Cochise/Santa Cruz	17.2469	,,SLG	No	No	No	No	No	Yes	No	3.00
39	37988	Miller Canyon	2	Cochise	14.1268	,,SLG	No	No	No	No	No	No	Yes	0.88
40	22339	H54_0081	1	Cochise	1.1287	T23.0S,R24.0E,S14	No	No	No	No	No	No	No	0.00
41	22637	H55_0105	3	Cochise	6.1509	T24.0S,R30.0E,S17	No	No	No	No	No	No	No	0.00

NOTES: The column headings are identified as follows:

W_ID: Unique ID number given to the watercourse.
W_NAME: Name of the watercourse.
SEGCOUNT: Number of segments merged together to comprise the watercouse.
W_COUNTIES: County(ies) where the watercourse is located.
W_MILES: Length of the watercourse in miles.
W_ADDRESS: Township, Range and Section of the mouth of the watercourse.
L1_PER: Level 1 stream classification - perennial or not.
L2_PER: Level 2 stream classification which includes Brown's perennial stream data.
L2_MBOAT: With or without modern boating account.
L2_HBOAT: With or without historical boating account.
L2_DIMP: Dam-impacted or not.
L2_FISH: With fish or not.
L2_SSTATUS: With special status designationo or not.
NEW_RAT Computed total rating of the watercourse based on the evaluated weights.

Table A-2C
L2 Watercourses in Cochise County with Evaluated Ratings

No. (1)	W_ID (2)	W_NAME (3)	SEGCOUNT (4)	W_COUNTIES (5)	W_MILES (6)	PER_RAT (7)	HBOAT_RAT (8)	MBOAT_RAT (9)	DIMP_RAT (10)	FISH_RAT (11)	SS_RAT (12)	TOT_RAT (13)	REF_RAT (14)
1	38027	Morse Canyon	4	Cochise	2.97	1.0	0.0	0.0	0.0	1.00	0.000	2.00	11.00
2	38326	Redfield Canyon	22	Cochise/Graham/Pima	24.30	1.0	0.0	0.0	0.0	0.75	0.440	2.19	10.88
3	38642	Swamp Springs Canyon	4	Cochise/Graham	5.70	1.0	0.0	0.0	0.0	0.75	0.440	2.19	10.88
4	38559	South Fork Cave	6	Cochise	8.09	1.0	0.0	0.0	0.0	0.75	0.130	1.75	10.26
5	402	Cave Creek - Cochise	13	Cochise	17.53	1.0	0.0	0.0	0.0	0.75	0.130	1.88	10.26
6	38771	Turkey Creek - Cochise	12	Cochise	35.64	1.0	0.0	0.0	0.0	0.75	0.000	1.75	10.00
7	107	Babocomari River - Cochise	12	Cochise	20.08	0.5	0.0	0.0	0.0	1.00	0.440	1.94	8.38
8	37692	Hot Springs Canyon	20	Cochise	25.91	0.5	0.0	0.0	0.0	0.75	0.880	2.13	8.26
9	36134	Parker Canyon	1	Cochise/Santa Cruz	1.56	0.5	0.0	0.0	1.0	0.00	0.000	0.50	7.50
10	38900	Whitewater Draw	35	Cochise	57.95	0.5	0.0	0.0	0.0	1.00	0.000	1.50	7.50
11	729	East Turkey Creek	8	Cochise	13.59	1.0	0.0	0.0	0.0	0.00	0.000	1.00	7.00
12	20378	H46_0854	4	Cochise	2.47	1.0	0.0	0.0	0.0	0.00	0.000	1.00	7.00
13	20384	H46_0861	2	Cochise	3.66	1.0	0.0	0.0	0.0	0.00	0.000	1.00	7.00
14	37461	H84_0470	1	Cochise	0.18	1.0	0.0	0.0	0.0	0.00	0.000	1.00	7.00
15	37476	H84_0485	2	Cochise	0.21	1.0	0.0	0.0	0.0	0.00	0.000	1.00	7.00
16	37398	Ramsey Canyon	2	Cochise	13.28	0.5	0.0	0.0	0.0	0.00	0.880	1.38	5.26
17	132	Bass Canyon	1	Cochise/Graham	6.18	0.0	0.0	0.0	0.0	0.75	0.880	1.63	4.76
18	37832	Leslie Creek	4	Cochise	14.06	0.0	0.0	0.0	0.0	0.75	0.880	1.63	4.76
19	38378	Rucker Canyon	10	Cochise	10.41	0.0	0.0	0.0	0.0	1.00	0.130	1.00	4.26
20	138	Bear Creek - Cochise	5	Cochise	7.04	0.0	0.0	0.0	0.0	1.00	0.000	1.00	4.00
21	557	Cottonwood Draw	1	Cochise	10.54	0.0	0.0	0.0	0.0	1.00	0.000	1.00	4.00
22	22314	H54_0055	1	Cochise	4.86	0.0	0.0	0.0	1.0	0.00	0.000	1.00	4.00
23	22516	H54_0277	3	Cochise	7.71	0.0	0.0	0.0	1.0	0.00	0.000	1.00	4.00
24	22536	H54_0301	1	Cochise	3.27	0.0	0.0	0.0	1.0	0.00	0.000	1.00	4.00
25	37426	H84_0433	4	Cochise	6.95	0.0	0.0	0.0	1.0	0.00	0.000	1.00	4.00
26	38417	San Simon River	100	Cochise/Graham	78.23	0.0	0.0	0.0	1.0	0.00	0.000	1.00	4.00
27	37234	Garden Canyon	7	Cochise	12.04	0.5	0.0	0.0	0.0	0.00	0.190	0.50	3.88
28	221	Black Draw	9	Cochise	19.54	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
29	20375	H46_0849	2	Cochise	3.13	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
30	20385	H46_0862	2	Cochise	3.10	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
31	20390	H46_0867	3	Cochise	2.18	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
32	20391	H46_0868	1	Cochise	0.93	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
33	22525	H54_0289	5	Cochise	5.87	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
34	22529	H54_0293	2	Cochise	3.24	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
35	37092	H84_0040	1	Cochise	0.08	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
36	38040	Mulberry Draw	16	Cochise	20.00	0.5	0.0	0.0	0.0	0.00	0.000	0.50	3.50
37	37758	Joaquin Creek	2	Cochise	8.17	0.0	0.0	0.0	0.0	0.75	0.000	0.75	3.00
38	38774	Turkey Creek - Cochise/Sta. Cruz	8	Cochise/Santa Cruz	17.25	0.0	0.0	0.0	0.0	0.75	0.000	0.75	3.00
39	37988	Miller Canyon	2	Cochise	14.13	0.0	0.0	0.0	0.0	0.00	0.440	0.44	0.88
40	22339	H54_0081	1	Cochise	1.13	0.0	0.0	0.0	0.0	0.00	0.000	0.00	0.00
41	22637	H55_0105	3	Cochise	6.15	0.0	0.0	0.0	0.0	0.00	0.000	0.00	0.00

NOTES: The column headings are identified as follows:

W_ID: Unique ID number given to the watercourse.
W_NAME: Name of the watercourse.
SEGCOUNT: Number of segments merged together to comprise the watercouse.
W_COUNTIES: County(ies) where the watercourse is located.
W_MILES: Length of the watercourse in miles.
PER_RAT: Perennial rating evaluated for the watercourse.
HBOAT_RAT: Historical boating rating evaluated for the watercourse.
MBOAT_RAT: Modern boating rating evaluated for the watercourse.
DIMP_RAT: Dam-impacted rating evaluated for the watercourse.
FISH_RAT: Fish rating evaluated for the watercourse.
SS_RAT: Special status rating evaluated for the watercourse.
TOT_RAT: Total rating evaluated for the watercourse which is the sum of the six ratings.
REF_RAT: Refined total rating evaluated for the watercourse considering the numerical weights assigned to the six criteria.

Appendix B - Criteria Weight Evaluation

Figure B-1
Criteria Scoring Matrix

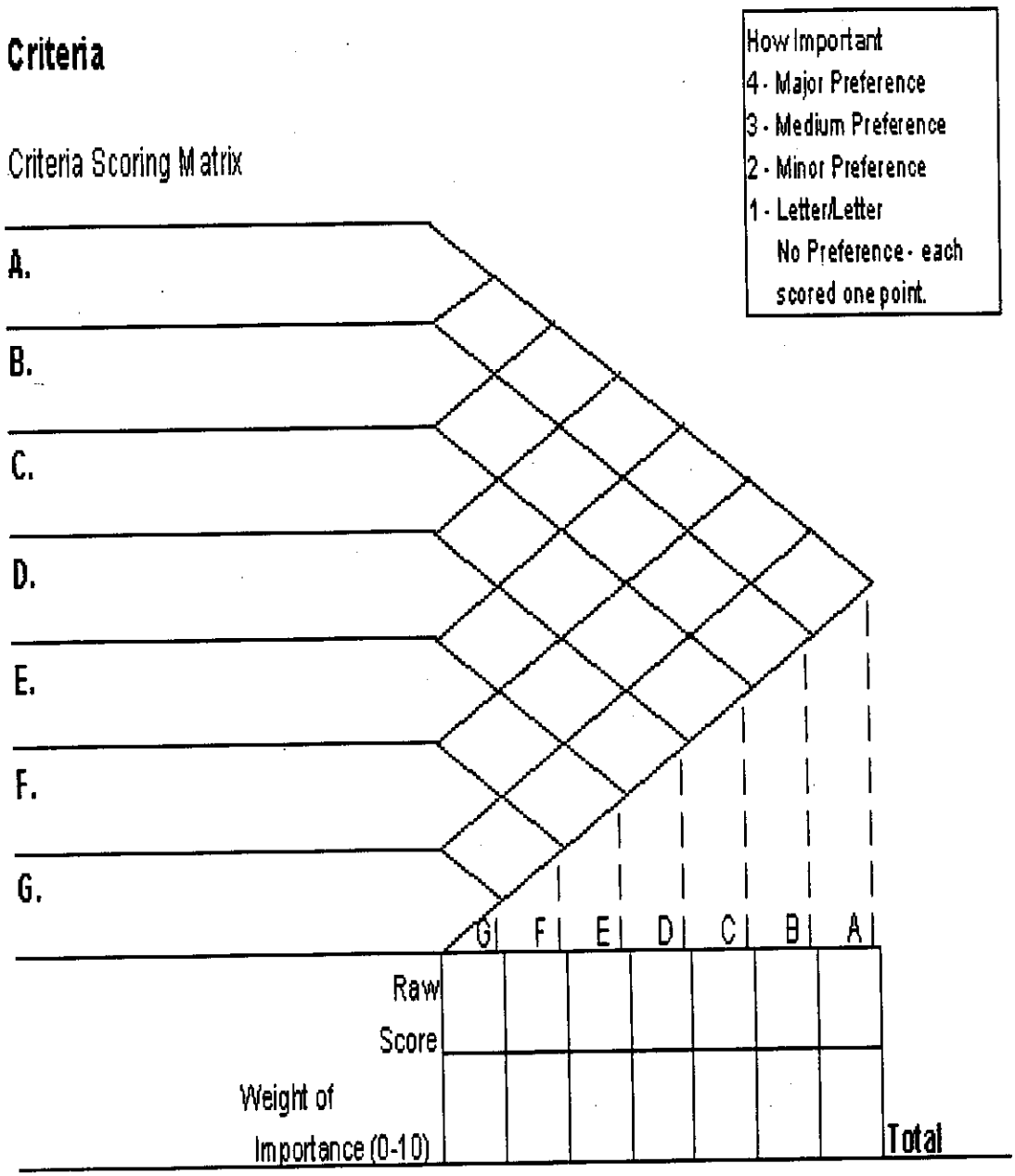


Table B-1
Evaluation of Numerical Weights for the Six Criteria

Item No.	Description of Criterion	Participant No.							Average Weight	Recommended Weight
		1	2	3	4	5	6	7		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1	Historical Boating	9	10	10	10	10	10	10	9.9	10
2	Modern Boating	3	7	10	9	7	10	7	7.6	8
3	Perennial	8	5	8	6	6	7	6	6.6	7
4	Dam-Impacted	7	2	4	2	4	5	3	3.9	4
5	Special Status	2	3	2	2	2	2	2	2.1	2
6	Fish	4	3	6	3	3	3	5	3.9	4

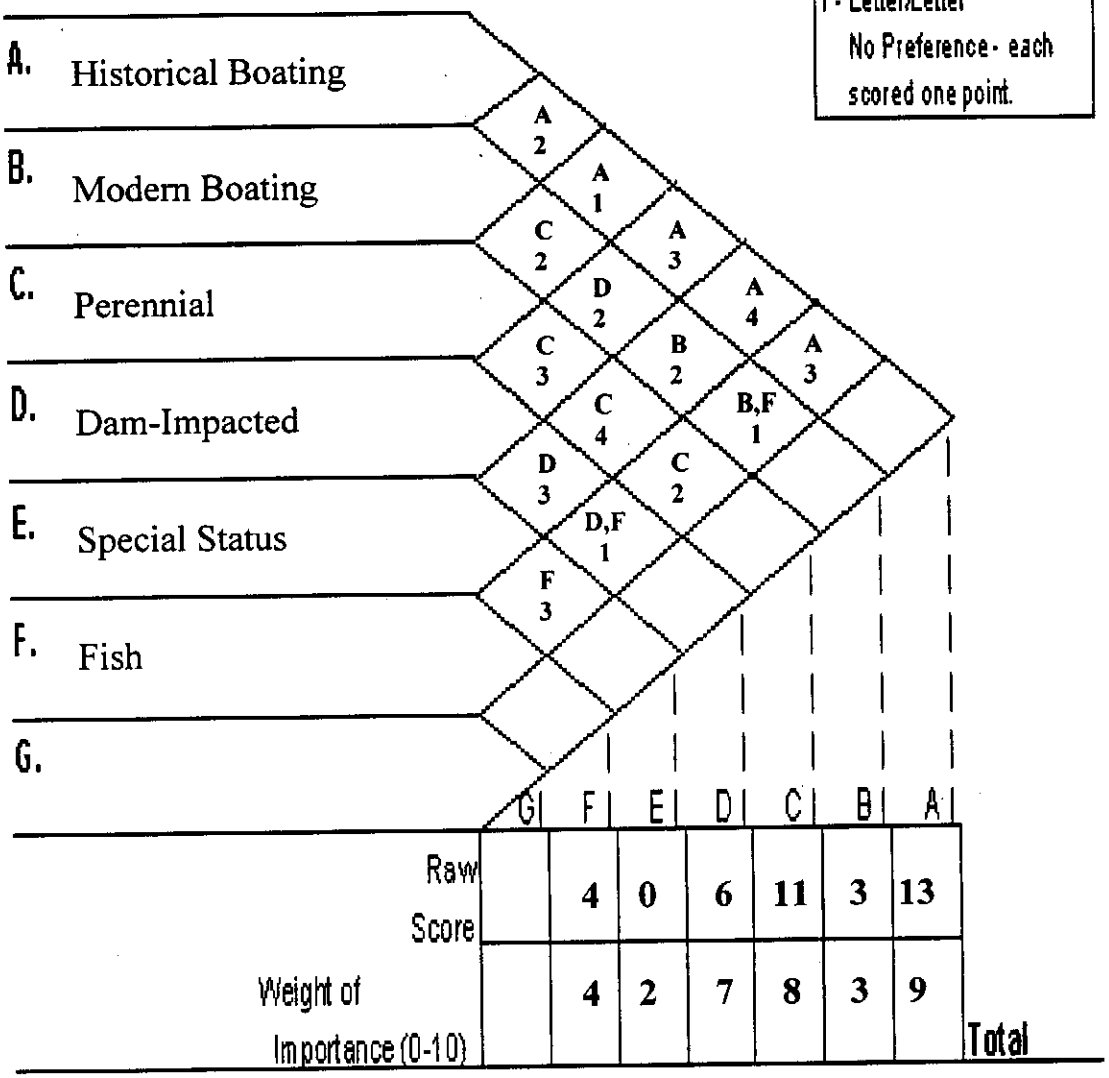
Note: For the list of participants involved in the determination of the criteria weights for the rating system, please refer to Table B-2 of this Appendix.

Participant No. 1

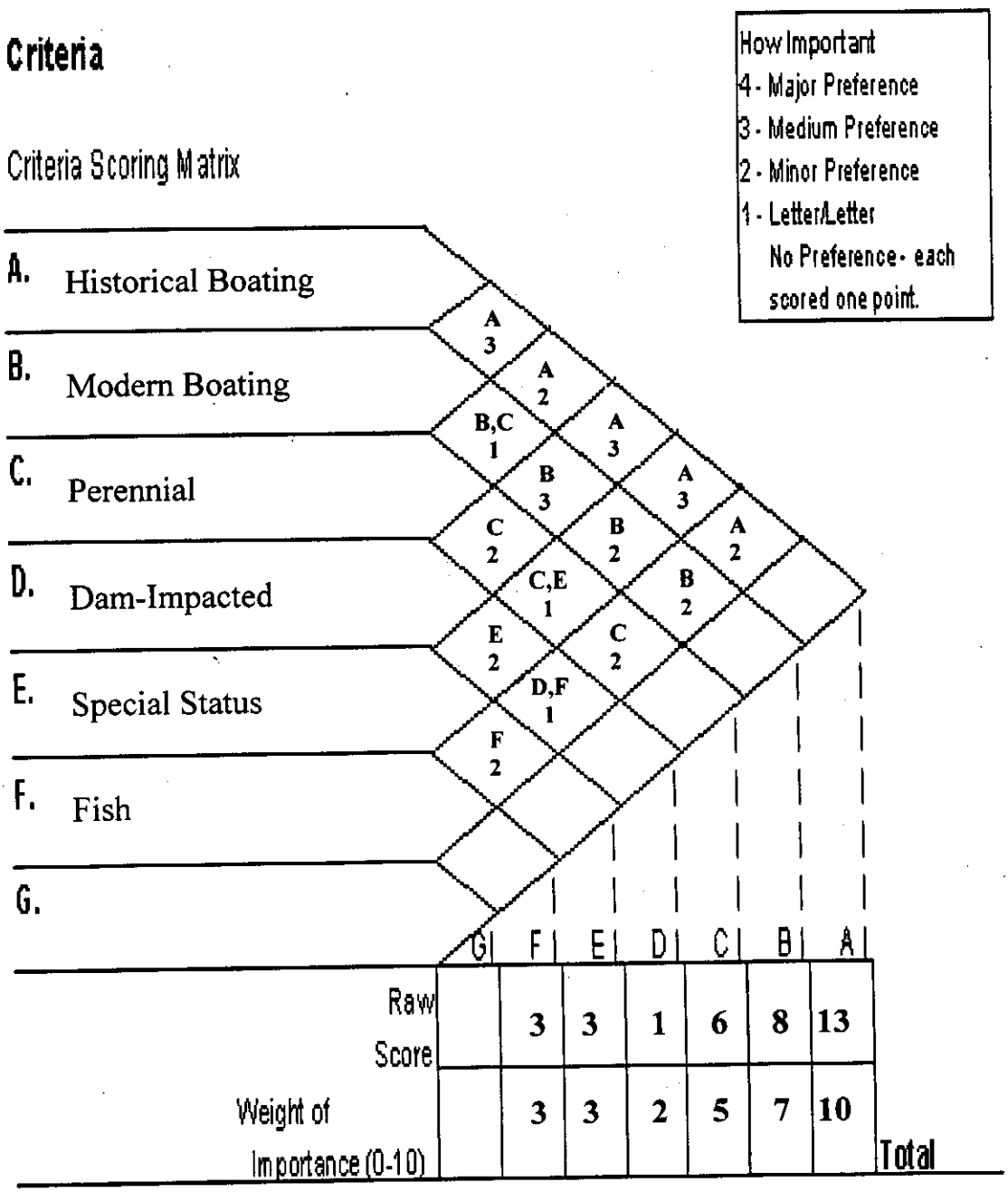
Criteria

How Important
4 - Major Preference
3 - Medium Preference
2 - Minor Preference
1 - Letter/Letter
No Preference - each scored one point.

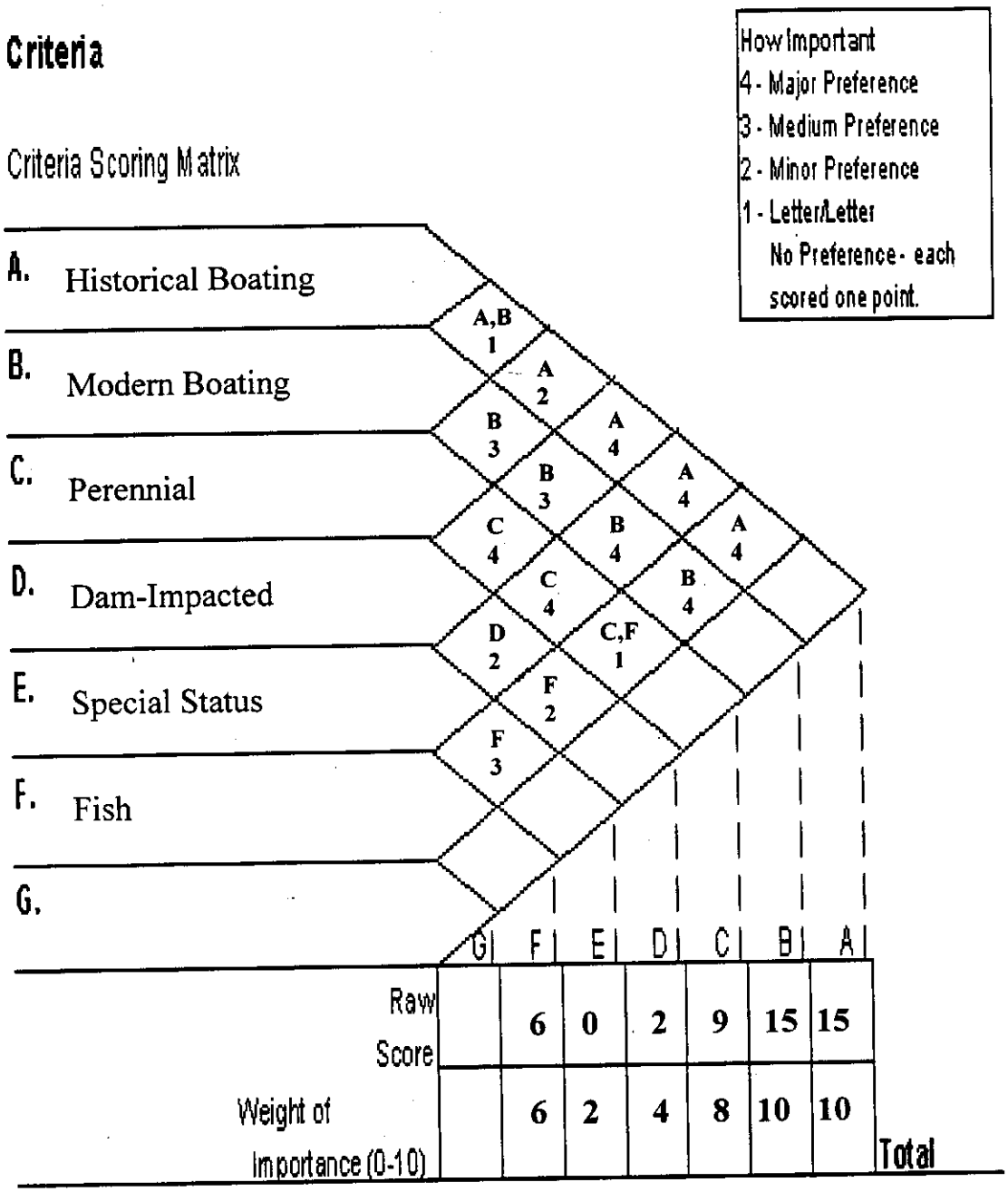
Criteria Scoring Matrix



Participant No. 2



Participant No. 3

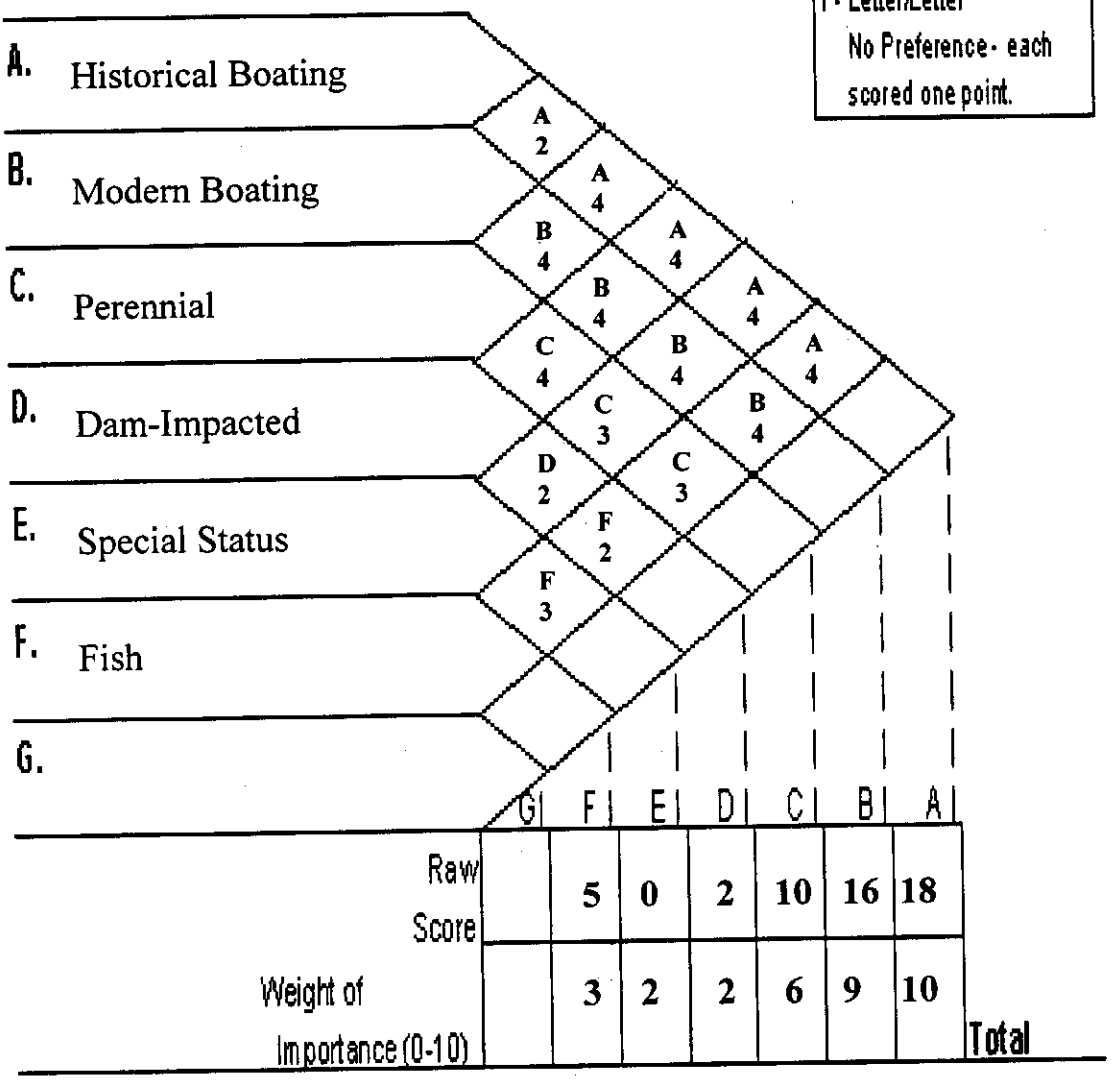


Participant No. 4

Criteria

How Important
4 - Major Preference
3 - Medium Preference
2 - Minor Preference
1 - Letter/Letter
No Preference - each scored one point.

Criteria Scoring Matrix

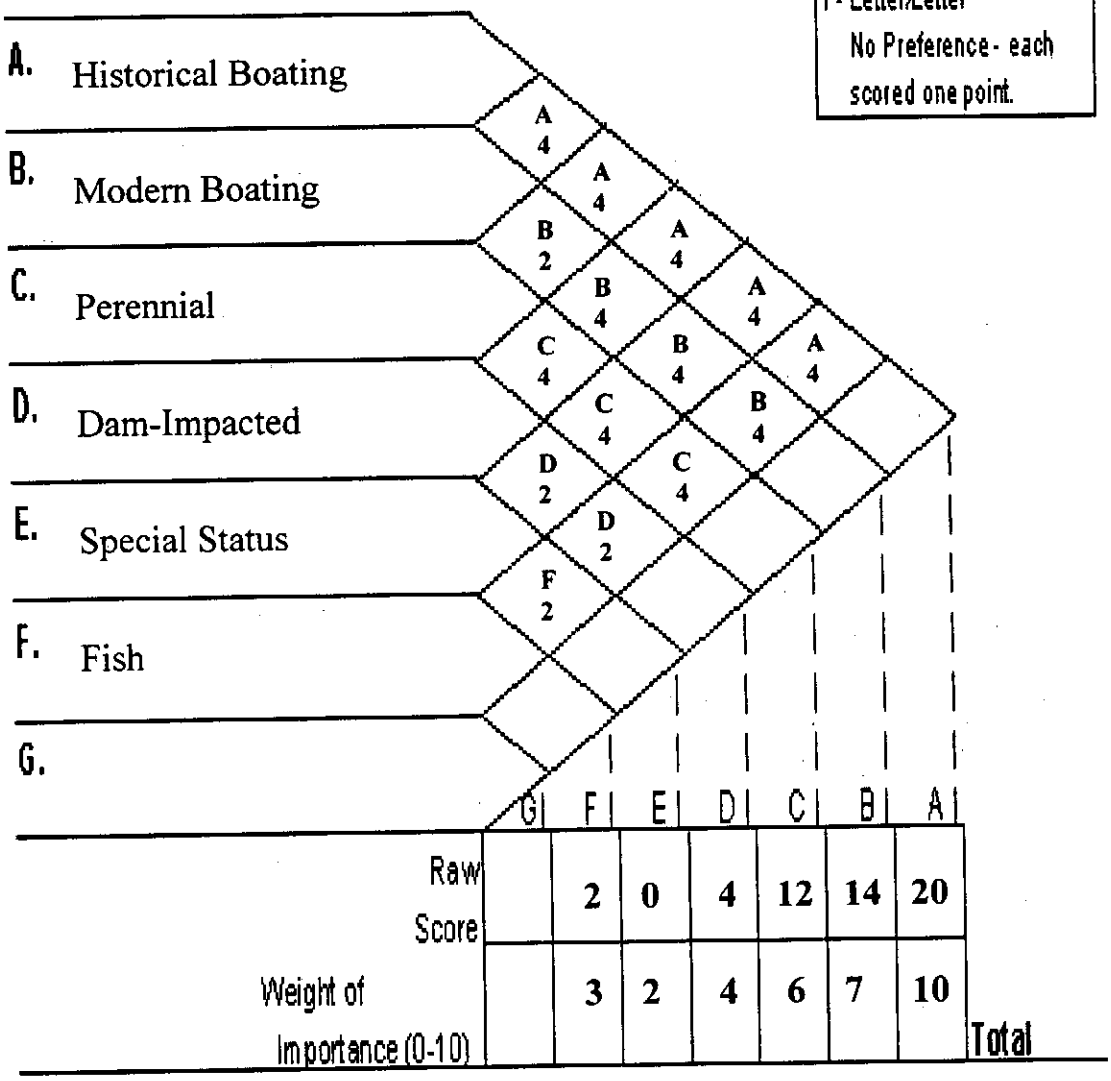


Participant No. 5

Criteria

How Important
4 - Major Preference
3 - Medium Preference
2 - Minor Preference
1 - Letter/Letter
No Preference - each scored one point.

Criteria Scoring Matrix

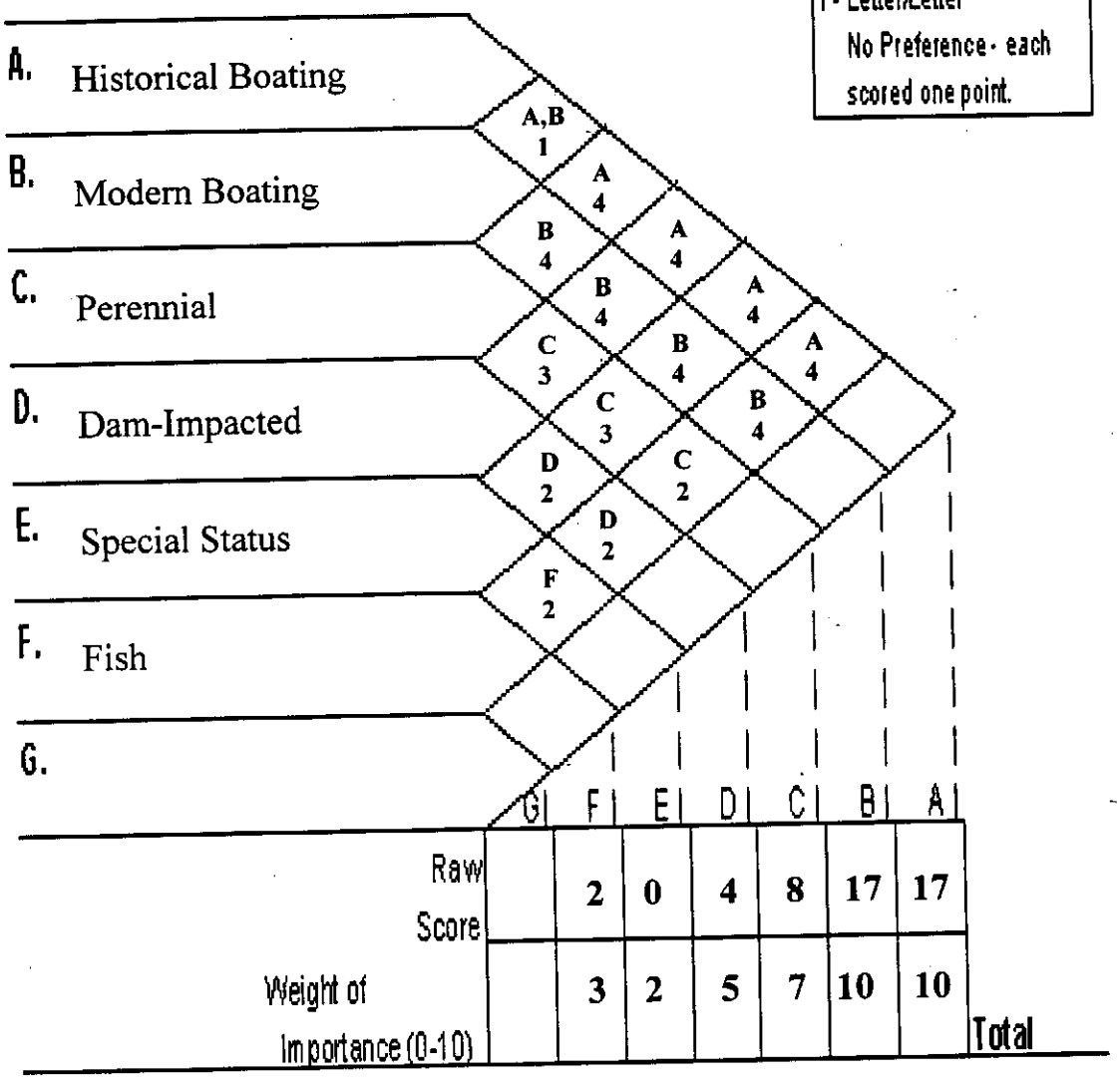


Participant No. 6

Criteria

How Important
4 - Major Preference
3 - Medium Preference
2 - Minor Preference
1 - Letter/Letter
No Preference - each scored one point.

Criteria Scoring Matrix



Participant No. 7

Criteria

How Important
4 - Major Preference
3 - Medium Preference
2 - Minor Preference
1 - Letter/Letter
No Preference - each scored one point.

Criteria Scoring Matrix

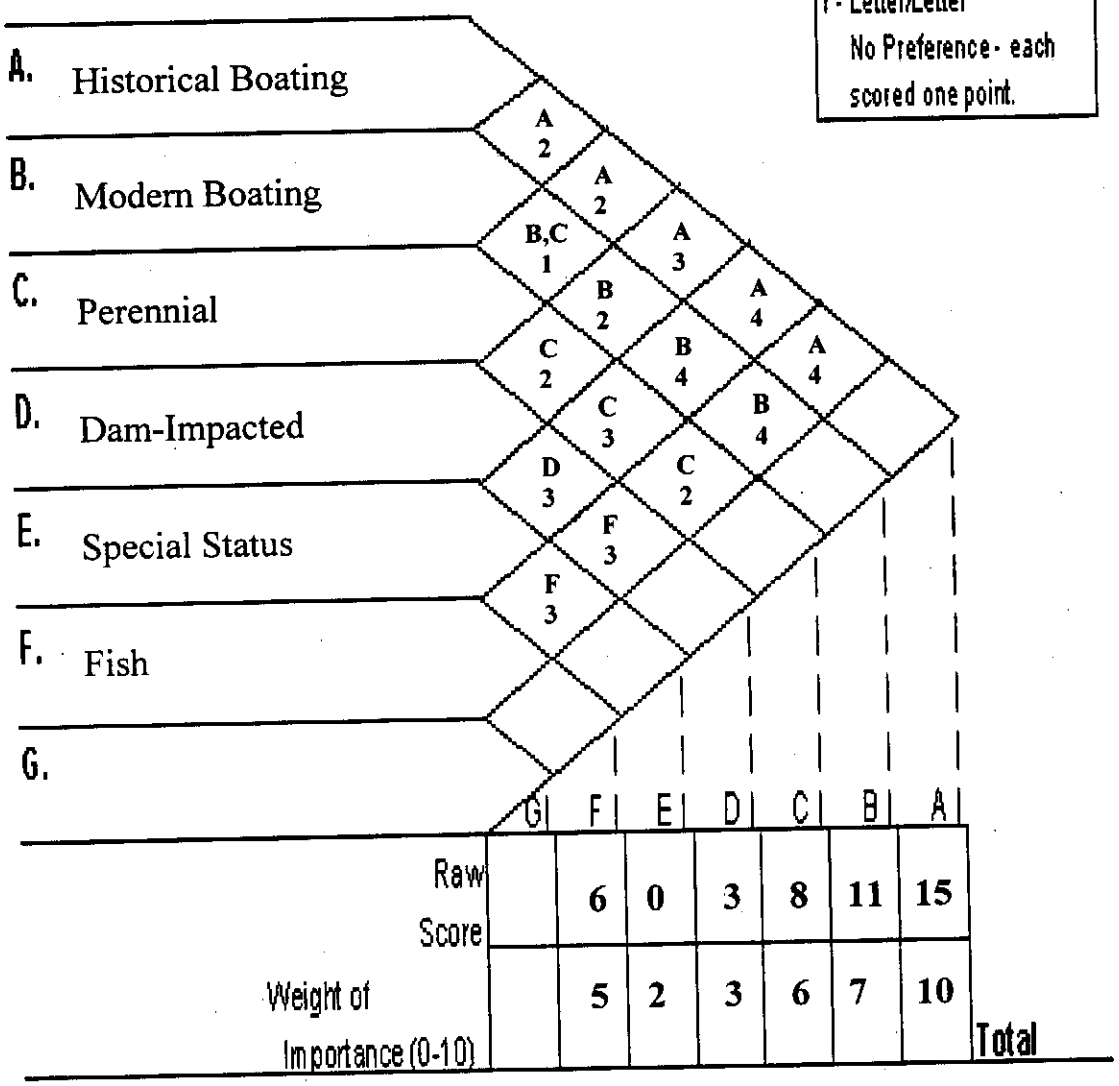


Table B-2

List of Participants Involved in the Determination of Criteria Weights
(in Alphabetal Order)

Name	Project Involvement	Official Position	Agency/ Company
(2)	(3)	(4)	(5)
Carlos C. Carriaga, P.E., Ph.D.	Project Manager (Stantec)	Water Resources Engineer	Stantec
V. Ottozawa Chatupron, P.E., Ph.D.	Former Project Manager (ASLD)	Manager, Engineering Section	ASLD
Patricia Q. Deschamps, P.E., R.L.S.	Former Project Manager (Stantec)	Senior Engineer	Navigant
Cheryl Doyle	Project Manager (ASLD)	Project Manager	ASLD
Jonathan E. Fuller, P.E., P.H.	Project Manager (JEF)	President	JEF
George V. Sabol, P.E., Ph.D.	Principal	Senior Associate	Stantec
Scot S. Schlund, P.E.	Principal	Division Manager, Water Resources	Stantec

Notes: Stantec – Stantec Consulting, Inc.
JEF – JE Fuller / Hydrology and Geomorphology, Inc.
ASLD – Arizona State Land Department
Navigant – Navigant Consulting, Inc.

Appendix C - General Information (Cochise County)

General Information

County Name:	Cochise County
Relative Location:	Southeast Corner of the State of Arizona
Neighboring Counties:	Graham and Greenlee Counties to the north and northeast, respectively; Santa Cruz County to the west; Pima County to the west; Hidalgo County, New Mexico to the east; and Mexico to the south.
Land Area:	6,215 mi.^{2}
County Seat:	Bisbee, Arizona
Population:	124,575[1] (July 1, 1999)
Maximum Elevation:	9,795 ft. @ Chiricahua Peak in the Chiricahua Mountains (109°17'15"W latitude and 31°50'30"N longitude).
Minimum Elevation:	3776 ft. @ Lonesome Valley of the San Pedro River (110°15'00" W latitude and 31°55'00"N longitude).
Major Industries:	Farming, Ranching, Tourism, Military
Labor Force (EST):	39,262
Date Established:	February 1, 1881
Landscape:	Vast array of mountain ranges and desert grasslands.

Note: [1] From Arizona Capitol Times published June 25, 2000.