

**Alaska Clean Water Actions  
(ACWA)**

**ACWA Decision Tree & Ranking Process**  
July 2006

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# ACWA Decision Tree & Ranking Process

## July 2006

### *Introduction & Overview*

The Alaska's Clean Water Actions (ACWA) decision tree outlines a process to:

- Determine if waterbodies are adequately protected;
- Identify and prioritize waterbodies-at-risk for additional protection action;
- Identify and prioritize waterbodies needing recovery for restoration or remediation action.

In the **Nomination Phase** individual waterbodies nominated by the public and agencies are reviewed and entered into the ACWA database (or returned to the nominator for additional information).

In the **Analysis Phase** each waterbody is analyzed to determine:

- Whether existing stewardship programs are adequate to maintain and protect the waterbody;
- Whether available data is sufficient to determine the existence or extent of a current or potential problem.

The **Analysis Phase** directs waterbodies to three possible actions or outputs:

- Waterbodies that are adequately protected;
- Waterbodies requiring additional data;
- Waterbodies that require additional protection or recovery.

Waterbodies-at-risk and waterbodies needing recovery, are addressed in the **Action Phase** by:

- Prioritizing individual waterbodies for action;
- Identifying and implementing protection or recovery actions;
- Evaluating the success of protection/recovery actions and directing the waterbody for additional information, continued monitoring or additional protection/recovery actions.

During all phases, additional data needs may be identified, sending the waterbody to the data collection track.

### *ACWA Decision Tree*

The [ACWA Decision Tree](#) diagrams the flow of information, pathways and critical decision points for the application of key criteria associated with a decision. The diagram is read left-to-right. Common objects are color-coded to simplify and help organize understanding.

Each object in the ACWA Decision Tree diagram is identified with an alpha-numeric character(s) near the upper part of the object. The alpha-numeric identifier is keyed to additional narrative description that further characterizes the object's purpose or function. In this

document, references to a Decision Tree object will be alpha-numerically referenced in parentheses ( ) following the descriptive reference.

The ACWA Decision Tree is segmented top-to-bottom, using alphabetical-only designators, into three primary tracks:

- Data Collection & Monitoring Track (D.)
- Stewardship Implementation Track (E.)
- Assessment Track (F.)

The Assessment Track (F.) is further segmented horizontally, left-to-right, into three different phases, as:

- Nomination Phase (A.)
- Analysis Phase (B.)
- Action Phase (C.)

The ACWA Decision Tree process starts in the Assessment Track (F.) and Nomination Phase (A.) with the Waterbody Nomination (1). End results yield three sets of ranked waterbodies and one set of unranked waterbodies, each requiring a unique set of stewardship action(s). The ranked waterbodies are categorized as:

- Data Collection & Monitoring (5A)
- Waterbodies At Risk (8A)
- Waterbody Recovery (9A)

A fourth set of unranked waterbodies residing in the Stewardship Track also results, categorized as:

- Adequately Protected Waterbodies (15A)

A step-by-step, narrative description through the ACWA decision tree is attached as APPENDIX I.

## **Use of Data Adequacy Review Procedure with Sufficient & Credible Data Support Tables**

A “Stewardship Analysis” is conducted on waterbodies submitted for review under ACWA. The purpose of the analysis is to determine if existing stewardship programs are adequate to address the water quantity, water quality and/or aquatic habitat support issue(s) identified in the ACWA submission. The following is an outline of how ACWA submissions are evaluated for the quality and adequacy of the information provided on the water body.

- Prior to conducting a “Stewardship Analysis” ACWA first evaluates the content and quality of the information and data submitted on the water body to determine if it is adequate to perform the analysis.
  - Information or data regarding a water body’s ability to maintain or support criteria or standards related to the three components of ACWA (Water Quantity”, “Water Quality”, or “Aquatic Habitat”) may be submitted.
  - A “Stewardship Analysis” can be performed on any component of ACWA for which adequate data is available.
  - Each issue identified in the submission is evaluated on an individual basis against the criteria or standards for the respective component of ACWA.
  - The evaluation is based on how substantial and credible the information and data is and the scientific rigor used for data collection.
  
- A “Sufficient and Credible Support Table” exists for each component of ACWA, attached as APPENDIX II. Data are evaluated for only those components for which the waterbody was nominated.
  - Each table consists of three information or data categories. The categories cover “Data Content”, “Data Coverage”, and “Data Quality”.
  - The table identifies a number of sub-categories or parameters containing information or data of a similar nature in each category.
  - The three information or data categories are transformed into a “Sufficient & Credible Data Support Table” by the addition of a fourth category, “Level of Confidence in Data”. This category denotes four levels of increasing confidence in the information submitted for each parameter.
  - For each level of confidence the table assigns criteria that information or data pertaining to that parameter has to meet.
  - Scoring for confidence in the data is accomplished by assigning a value of one (lowest confidence) to four (highest confidence) to the ‘Level of Confidence in Data’ category.
  - An example of the table for “Water Quantity” is attached as reference. Ten parameters necessary to evaluate the adequacy of the information and data submitted for this component, and criteria for confidence in the information and data at each data confidence level, are identified.
  
- When a water body is nominated under ACWA, issues related to one or more of the three components of ACWA are identified. The related information and data are sorted by issue.

- For each issue, information and data pertaining to the respective parameters are compiled.
- The information or data pertaining to each parameter are evaluated against the criteria in the respective table and assigned the highest level of confidence the information or data meets for that parameter.
- The level of confidence depends on how substantial the information contained in the submission is and/or the rigor used in producing or collecting it.
- The values assigned the parameters in each category are added to derive a total value for each component.
- The derived value for each category is then compared against a predetermined threshold value for that category.
- If the threshold values for all three categories are met or exceeded, the information on the water body contained in the submission is deemed adequate to conduct a “Stewardship Analysis”.
- If the derived value does not meet or exceed the threshold value for one or more of the three categories, the water body is routed to “Data Collection” until additional information sufficient to meet all three threshold values is acquired.

***Notes:***

- 1) Parameters addressed under “Data Content” evaluate how sufficiently and completely the information contained in the submission describes the nature and extent of the identified issue.
- 2) Parameters addressed under “Data Coverage” or “Data Quality” evaluate the quality of the information provided and how rigorous it is.
- 3) Information contained in the submission about a “Data Content” parameter may be so overwhelming that achieving the threshold values may be disregarded.

# Procedure for Ranking a Waterbody Using the ACWA Ranking Criteria

## *Introduction*

The “ACWA Ranking Criteria” were developed to assign a numeric value to a successfully nominated waterbody, resulting in a priority ranking. Many of these waterbodies may have insufficient data to suggest a current or anticipated problem and are tracked for further “data collection or monitoring.” Other waterbodies with sufficient and credible data to suggest that a current problem exists or that future problems are likely, will be subject to additional analyses that evaluate stewardship effectiveness and determine the persistence of standards or regulations violations. A number of these waterbodies are tracked as “at-risk” or “recovery.” A means to rank the waterbodies and assign a relative priority provides a method for agencies to focus attention on the waterbodies of highest priority.

## *Description of Ranking Criteria*

The [ACWA Ranking Criteria](#) consist of three Tables, attached as APPENDIX III. Each Table represents one (1) of three (3) components for each evaluated waterbody, including:

- Aquatic Habitat
- Water Quality
- Water Quantity

Each ranking component includes 6 parameters, or factors, and include:

- Allocation
- Condition
- Protection
- Future Use
- Present Use
- Value

The ranking criteria were designed to be simply applied, broadly measurable and uniquely applicable to all three components. Each parameter is assigned a Score (1, 3 or 5) based upon the Rating assigned. A brief “Description of the Rating” is provided to help define the means for measuring the factor and assigning either a high, medium or low rating. Additionally, the “Considerations” column provides a brief statement of the types of information useful in determining the rating for each factor under consideration.

## *Application of the Ranking Criteria*

Professional agency staff review available information and data related to a given waterbody and assign a parameter rating based upon available data and their best professional judgement for each factor. In many instances, the agency most knowledgeable and familiar with the data will likely be responsible for an individual component. For instance, the Department of Natural

Resource hydrologists are assigned the responsibility for assigning factor ratings for Water Quantity, whereas biologists within the Department of Fish & Game are assigned the responsibility for making Aquatic Habitat factor ratings. The Department of Environmental Conservation is assigned the responsibility for assigning Water Quality ratings. Alternatively, each resource agency may have professional staff available to assign factor-ratings for each component. Differences between agencies' assigned scores are resolved through consensus and a combined agency score is assigned for the specific waterbody component.

Waterbodies are only ranked for those components for which there are "credible and sufficient data." or for which they were nominated. In those instances where more than one component was scored, the component receiving the highest score is the score that is used to rank the waterbody. Individual component scores are not added together, nor are they averaged. All waterbodies are scored in a similar fashion until each waterbody is assigned a "final ranking score." Waterbodies are ranked in descending order of their "final ranking score" and each waterbody is assigned a high, medium or low priority, based upon a threshold set by a rank percentile analysis.

See example case on next page.

*Example Case for Application of Ranking Criteria:*

**Waterbody:** Dry Run Creek

<b>Component</b>	<b>Parameter</b>	<b>Score</b>	<b>Component Sum</b>
Aquatic Habitat	Allocation	1	
	Condition	3	
	Protection	1	
	Future Use	5	
	Current Use	3	
	Value	1	
			14
Water Quality	Allocation	3	
	Condition	5	
	Protection	3	
	Future Use	3	
	Current Use	1	
	Value	3	
			18
Water Quantity	Allocation		
	Condition		
	Protection		
	Future Use		
	Current Use		
	Value		
			0
<b>Highest component of those scored =</b>		<b>18</b>	<b>Final Ranking Score</b>

**APPENDIX I: Step-by-step Narrative Description Of the ACWA Decision  
Tree**

## APPENDIX I

### Step-by-step Narrative Description Of the ACWA Decision Tree

#### *A. Nomination Phase*

- 1 Waterbody Nomination Form Submitted** - Nominations are accepted either by open solicitation or by using the form, which is available on the ACWA Web Page at: [http://info.dec.state.ak.us/awq/awca/waterbody/acwa1\\_interface/Results/submission\\_form.asp](http://info.dec.state.ak.us/awq/awca/waterbody/acwa1_interface/Results/submission_form.asp)
  
- 2 Is basic, minimum information provided?**
  - 2A CRITERIA USED:** Contained in ACWA Waterbody Nomination Form. The Waterbody Nomination Form provides the criteria to determine if basic, minimum information is provided. There are certain fields that are required for a nominated waterbody to be entered into the ACWA database. **These mandatory fields are indicated by double asterisks.\*\***
  
  - 2B Establish File on Waterbody Nomination** - If certain data is missing, then the water is given a "No" determination and is moved to: **2B**. Establish file on Waterbody Nomination. The nominated waterbody is held here while missing information is requested. If no information is received, the nomination remains in a pending status. When the missing information is received, the waterbody nomination starts again at **1**.
  
- 3 Waterbody Entered into ACWA Database** - A "Yes" determination for **2** will move the nominated waterbody to **3** where it will be entered into the ACWA database. From here the waterbody will enter the Analysis Phase along the Assessment Track.

#### *B. Analysis Phase*

- 4 Are the data provided adequate to conduct a problem, risk or value analysis?** Criteria to make this determination are provided in **4A**
  - 4A CRITERIA USED: Contained in the three Sufficient and Credible Data Support Tables** - Criteria to determine whether the data provided are adequate to conduct a problem, risk or value analysis are contained in the Sufficient and Credible Data Support Tables for 1) Water Quantity, 2) Water Quality, and 3) Aquatic Habitat.

A **NO** determination for **4** will route the nomination to **5** in the Data Collection and Monitoring Track where it will be prioritized. This pathway also applies to waterbodies nominated **ONLY** for monitoring.

A "Yes" determination for **4** will advance the nominated waterbody to **6**.

**6 Are stewardship programs adequate to maintain and protect a waterbody?** Criteria for this determination are contained in **6A**.

**6A CRITERIA USED: Contained in Statutes, regulations, standards, BMP's etc...**

A "No" determination for **6** – There are foreseeable problems; additional action is needed and these factors will move it to **7**.

A "Yes" determination for **6** will move the water nomination to **15A**.

**7 Are additional recovery actions required?**

**7A CRITERIA USED: Identified through a determination of the presence of documented and persistent violations of regulations or standards.**

A "No" determination for **7** will move the water into **8**.

A "Yes" determination for **7** will move the water into **9**.

### ***C. Action Phase***

**8 Protect & Maintain Waterbodies At Risk Track**

**8A Waterbodies at Risk Ranked Priorities** - Here the waters are prioritized using the revised ACWA Ranking Criteria identified in **10**. They then move to **11**.

### **OR**

**9 The Waterbody Recovery Track** - From here the water moves into *(C.) the Action Phase* where it is ranked for priority using **10**.

**9A Waterbody Recovery Ranked Priorities** – Waterbodies in **9** are ranked to form the Waterbody Recovery Ranked Priorities in **9A** and move on to **12**.

**10 CRITERIA USED: Contained in four "ACWA Waterbody Ranking Tables"**- The nominated waterbody is ranked using the four ACWA Waterbody Ranking Tables.

**11 & 12 Identify and Implement Additional "Protection & Maintenance" OR "Restoration, Recovery or Remediation" Actions for Priority Waterbodies** - Using the available data and prioritization ranking on the waterbody, ACWA will assess the higher priority waterbodies to determine: a) if additional data is needed to determine additional stewardship actions, b) whether the original stewardship programs were actually implemented, c) if not, why not, d) if so, why they didn't adequately protect the waterbody, and what additional action is needed to protect, maintain, restore, recover or remediate the waterbody, and e) how to ensure that the needed actions are implemented through the existing stewardship programs. If additional data are needed to make these determinations, these data will be collected.

**13 Did actions produce desired stewardship results?**

A "No" determination for **13** moves the water to **14**.

A "Yes" determination for **13** moves the water to **15A**.

**14 Re-analysis**

**15A Adequately Protected and Maintained Waterbodies.** These waterbodies are adequately protected and maintained by existing stewardship programs. Current stewardship practices will continue, and the waterbody will be monitored for new information or re-evaluated every 5 years - re-evaluation or new information may move a water back onto an active water track.

**APPENDIX II: SUFFICIENT & CREDIBLE DATA TABLES FOR WATER  
QUALITY, WATER QUANTITY & AQUATIC HABITAT**

## WATER QUANTITY Sufficient & Credible Data Tables

	<b>Category Water Quality</b>					
<b>Level of Confidence in Data Value</b>	<b>Data Content</b>		<b>Data Coverage</b>		<b>Data Quality</b>	
	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>
<b>0</b>	Assessment	No basis established.	Spatial	No data available.	QA/QC	No QA/QC available.
	Land Use	No land use information or maps provided. Man induced impacts not identified.	Temporal	No information available.	Protocols	No protocols available or identified.
	Reference Condition	No monitoring parameters or data provided and no reference condition established.			Relevance	Assertions lack any documentation and are irrelevant.
	Source	No source acknowledged or evidence to even suggest a source.				
	Photographs	None.				
<b>1</b>	Assessment	Based solely on observation or perception of a problem.	Spatial	Limited or no data at critical locations.	QA/QC	Noted and/or described. Data quality is suspect or unknown.
	Land Use	General land use information provided, but no maps available.	Temporal	Based on sporadic or singular observations. Period of record is incomplete.	Protocols	Incomplete or no protocols noted and/or described. Protocols not followed. Detection limits are too high. Samples not properly preserved.

## WATER QUANTITY Sufficient & Credible Data Tables

	Reference Condition	Monitoring parameters are limited for problem definition. No comparison to a reference condition.			Relevance	No observation date or >5 years old. The ambient conditions provided are marginally relevant to the water quality problem described.
	Source	No evidence of man induced impacts identified. Source is extrapolated from upstream or downstream condition.				
	Photographs	One photograph provided, but fails to demonstrate the relevant water quality issue.				
<b>2</b>	Assessment	Simple assessment. Source, nature, and extent of water quality problem is described. Sample data is based on grab or composite water quality samples.	Spatial	Moderate spatial coverage, relative to size of waterbody. Coverage does not adequately target probable impairments (e.g., one location). Limited data with no exceedances of standards, however sediments indicate contamination and probable sources of contaminants are located in the watershed.	QA/QC	Data quality and sensitivity is low to moderate. Toxicity test replication is low. No contamination evident from QC. Low detection limits.
	Land Use	General information and maps are provided but are not specific to water quality problem described.	Temporal	Moderate temporal coverage; data collected at critical periods; may include quarterly sampling; short periods of record must include good spatial coverage.	Protocols	Data collected following appropriate protocols; training of individuals was limited.

## WATER QUANTITY Sufficient & Credible Data Tables

	Reference Condition	Reference condition can be approximated by professional based upon information provided. Limited chemical parameters. May include: historical fish contaminate levels, screening model results, acute or chronic testing, sediment contamination data or source water assessment map.			Relevance	Information used to base assessment not recently collected (>5 years old) but useful to give a historical perspective for approximating reference condition or trends.
	Source	Indirect evidence that problem is due to man induced impacts. Probable impairment causes are targeted and probable sources of impairment documented.				
	Photographs	Several photographs of water quality problem are provided.				
<b>3</b>	Assessment	Intermediate assessment. Source, nature, and extent of water quality problem are substantially described. Sample data is based on series of grab or composite water quality samples.	Spatial	Broad spatial coverage with sufficient frequency to capture acute events.	QA/QC	Data has moderate precision and sensitivity, moderate replication used in toxicity tests; QC documents no significant sampling or analytical errors.
	Land Use	Detailed information and maps are provided and are specific to water quality problem described, but lack direct link to a source or the identified problem.	Temporal	Broad temporal coverage with sufficient frequency to capture acute events; monthly sampling during key periods; lengthy period of record (sampled over period of months for >2 years.)	Protocols	Professional scientist provides training; the sampler is well trained. A qualified professional collects the samples. Data analyzed in competent (certified) laboratory that uses methods with low detection levels.

## WATER QUANTITY Sufficient & Credible Data Tables

	Reference Condition	Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment. Combination of two or more reinforcing analyses, using: water column, sediment, chlorophyll, toxicity testing, or bioaccumulation data. IF drinking water, total & dissolved metals measured; organic compounds measured.			Relevance	Data are older than five years, but there are no indications that the condition it reflects have changed significantly.
	Source	Direct evidence that problem is due to man induced impacts. Impairment causes are targeted and sources of impairment documented. Width/depth integrated sampling employed. Models calibrated.				
	Photographs	Numerous photographs of water quality problem are provided that include documentation of time, ambient conditions and camera settings.				
<b>4</b>	Assessment	Detailed assessment of water quality problem provided.	Spatial	Assessment based on multiple sample sites adequate for statistical analysis to assess differences.	QA/QC	High level of precision and sensitivity. High replication for toxicity tests.
	Land Use	Information and/or maps provided are relevant and sufficient to document water quality problem.	Temporal	Assessment based on data collected over multiple time frames for a period > 3 years, with sufficient frequency and parameter coverage to capture acute events, chronic conditions and other potential impacts.	Protocols	Data collected and analyzed by qualified professionals following detailed QA/QC protocols.

## WATER QUANTITY Sufficient & Credible Data Tables

Reference Condition	Abundant quantitative data on reference conditions are provided. Three or more quantitative analyses support assessment including: water column chemistry, sediment chemistry, chlorophyll, bioaccumulation data or toxicity testing. If drinking water, total & dissolved metals measured; organic compounds measured; sampling and analysis includes sediments.			Relevance	Quantitative data is current, generally less than five years old, and there is no doubt that the assessment reflects current conditions. There have not been any significant changes in activities occurring in the watershed since the data were collected.
Source	Substantial information that problem is due to man induced impacts is provided.				
Photographs	Comprehensive photos documenting extent of water quality problem are provided.				

Category - Water Quantity						
Level of Confidence in Data	Data Content		Data Coverage		Data Quality	
	Parameter	Description	Parameter	Description	Parameter	Description
<b>0</b>	Assessment	No basis established.	Spatial	No data available.	QA/QC	No QA/QC noted and/or described.
	Land and Water Uses	No information or maps provided.	Temporal	No information available.	Protocols	No protocols noted and/or described.

## WATER QUANTITY Sufficient & Credible Data Tables

	Reference Condition	No data to make comparison and no reference condition identified.			Relevance	No observation date provided or not relevant to water quantity problem described.
	Source	No source acknowledged or evidence to even suggest a source for the problem.				
	Photographs	None.				
<b>1</b>	Assessment	Based solely on observation or perception of a problem.	Spatial	Based on observation taken at a single site or limited access point.	QA/QC	QA/QC data provided indicating poor overall data quality.
	Land Use	General land use information provided, but no maps available.	Temporal	Based on sporadic or singular observation.	Protocols	Based upon visual observation alone.
	Reference Condition	No comparison to a reference condition.			Relevance	No observation date or 5 yrs old and only marginally relevant to the water quantity problem described.
	Source	No man induced impacts identified.				
	Photographs	One photograph provided, but fails to demonstrate the relevant water quantity issue.				
<b>2</b>	Assessment	Simple assessment. Source, nature, and extent of water quantity problem are described. No quantitative data provided.	Spatial	Based on one repetitive visited site.	QA/QC	Very little QA/QC information pertaining to assessment is provided.

## WATER QUANTITY Sufficient & Credible Data Tables

	Land Use	General information and maps are provided but are not specific to water quantity problem described.	Temporal	Assessment based on annual visit non-specific to season.	Protocols	Simple assessment protocols are identified.
	Reference Condition	Descriptive information on reference condition is provided but no quantitative data.			Relevance	Information used to base assessment on not recently collected but useful to give a historical perspective for approximating reference condition or trends.
	Source	Indirect evidence that problem is due to man induced impacts.				
	Photographs	Several photographs of water quantity problem are provided.				
<b>3</b>	Assessment	Assessment of water quantity problem with a few quantitative measurements.	Spatial	Assessment based on more than one sample site.	QA/QC	Quantitative data submitted with a moderated amount of QA/QC information
	Land Use	Information and/or maps provided are relevant but not sufficient to document water quantity problem.	Temporal	Assessment based on data collected over a single time frame.	Protocols	Quantitative data collected with standardized protocols.
	Reference Condition	Sparse quantitative data on reference condition.			Relevance	Information use to base assessment on is recent. Useful for approximating reference conditions or identifying trends.

## WATER QUANTITY Sufficient & Credible Data Tables

	Source	Some evidence that problem is due to man induced impacts is provided.				
	Photographs	Many photographs documenting water quantity problem are provided.				
<b>4</b>	Assessment	Detailed assessment of water quantity problem provided. Multiple quantitative measurements support assessment.	Spatial	Assessment based on multiple sample sites adequate for statistical analysis.	QA/QC	Quantitative data submitted with a large amount of QA/QC information and highly acceptable data quality indications.
	Land Use	Information and/or maps provided are relevant and sufficient to document water quantity problem.	Temporal	Assessment based on data collected over multiple time frames.	Protocols	Quantitative data collected with standardized protocols.
	Reference Condition	Abundant quantitative data on reference conditions are provided.			Relevance	Quantitative data is current. There is no doubt that the assessment reflects current conditions.
	Source	Substantial information that problem is due to man induced impacts is provided.				
	Photographs	Comprehensive photos documenting extent of water quantity problem are provided.				

## WATER QUANTITY Sufficient & Credible Data Tables

	<b>Category - Habitat</b>					
<b>Level of Confidence in Data</b>	<b>Data Content</b>		<b>Data Coverage</b>		<b>Data Quality</b>	
	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>
<b>0</b>	Assessment	No basis established.	Spatial	No data available.	QA/QC	No QA/QC. Data quality is indeterminate.
	Land and Water Uses	No documentation.	Temporal	No documentation. Period of record is unknown.	Protocols	No data collected or unknown protocols.
	Reference Condition	No monitoring parameters or data provided and no reference condition established.			Relevance	No data provided and assertions are irrelevant and lack documentation.
	Source	No source acknowledged or evidence even to suggest a source.				
	Photographs	None.				
<b>1</b>	Assessment	Visual observations of habitat characteristics were made with no true assessment. No direct documentation of current or historical use by individual species.	Spatial Temporal	Assessments are only made at limited access points such as road crossings, or other types of accessible areas, or by aerial flyover.	QA/QC	Incomplete QA/QC noted and/or described. Data quality is suspect.

## WATER QUANTITY Sufficient & Credible Data Tables

	Land and Water Uses	Only has documentation of land and water use practices that might alter habitat	Temporal	Based on sporadic or singular observations. Period of record is incomplete.	Protocols	Data were not collected by trained individuals following appropriate protocols.
	Reference Condition	No attempt to compare to reference condition; observed impacts are likely to be natural.			Relevance	Data are not relevant; habitat has likely changed significantly since the assessment was made.
	Source	No evidence of man induced impacts identified. Source is extrapolated from upstream or downstream condition.				
	Photographs	One photograph provided, but fails to demonstrate the relevant habitat issue.				
<b>2</b>	Assessment	Visual observations of habitat characteristics were made with simple assessment. Direct visual observation of evidence of use by individual fish and wildlife species (e.g. spawning adults; tracks, bones, wildlife migration, nesting, animal scat). Anecdotal historical information of use by species.	Spatial	Limited spatial coverage. Site specific studies.	QA/QC	Data precision and sensitivity are low.
	Land and Water Use	Use of land use and topographic maps, other reports to characterize watershed condition; probable sources of impairment are documented.	Temporal	Limited to annual visit and nonspecific to season.	Protocols	Qualified professional involved only through correspondence. Data were collected following appropriate protocols; however, individuals had limited training.

## WATER QUANTITY Sufficient & Credible Data Tables

	Reference Condition	Reference condition can be approximated by a qualified professional			Relevance	Data can be used to give an historical perspective for approximating reference condition or trends. It is unlikely that the habitat has changed significantly since the assessment was made.
	Source	Indirect evidence that problem is due to man induced impacts. Probable impairment causes are targeted and probable sources of impairment documented.				
	Photographs	Several photographs of current channel, watershed, lake condition, waterbody are provided.				
<b>3</b>	Assessment	Use of visual-based habitat assessment following standard SOPs (e.g., Stream Reach Assessment and PFC.) Assessment includes quantitative measurements of selected parameters. Species use documented by limited sampling.	Spatial	An attempt was made to access the stream reach, lake, or other type of waterbody wherever possible. Assessment is broad; often covering the entire stream reach or targeted portion of waterbody	QA/QC	Data has moderate precision and sensitivity.
	Land and Water Use	Data on land and water uses are used to supplement assessment	Temporal	Assessment during a single season the norm.	Protocols	Professional biologist performs survey or provides training. Professional biologist or hydrologist performs the assessment.
	Reference Condition	Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment.			Relevance	Data were collected recently or are very unlikely that the habitat has changed significantly since the assessment was made.

## WATER QUANTITY Sufficient & Credible Data Tables

	Source	Direct evidence that problem is due to man induced impacts.				
	Photographs	Photographs of channel, watershed, lake, or other waterbody condition prior to alteration and current conditions are provided.				
4	Assessment	Assessment of habitat based on quantitative measurements of instream parameters, channel morphology and floodplain characteristics, preferably under standardized and commonly used protocols. Designed quantitative sampling using established protocols.	Spatial	Assessment based on good access of the entire stream reach including private property. Helicopter surveys, etc.	QA/QC	High level of precision and sensitivity.
	Land and Water Use	Information and/or maps provided are relevant and sufficient to document habitat quality.	Temporal	Data from multiple years.	Protocols	Assessment was performed by a highly experienced professional.
	Reference Condition	Reference condition is well understood and is used as the basis of the assessment.			Relevance	Data are current; there is no doubt that the assessment reflects current conditions and documents past conditions.
	Source	Direct evidence that problem is due to man induced impacts.				

## WATER QUANTITY Sufficient & Credible Data Tables

	Photographs	Comprehensive historical photographs of channel, watershed, lake, and waterbody condition prior to alteration and current conditions are provided, including specific dates, ambient conditions and full descriptive documentation. Groundtruthing.				
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## HABITAT Sufficient & Credible Data Tables

<b>Category</b>						
<b>Level of Confidence in Data</b>	<b>Data Content</b>		<b>Data Coverage</b>		<b>Data Quality</b>	
	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>
<b>1</b>	Assessment	Visual observations of habitat characteristics were made with no true assessment. No direct documentation of current or historical use by individual species.	Spatial Temporal	Assessments are only made at limited access points such as road crossings, or other types of accessible areas, or by aerial flyover.	QA/QC	Incomplete or no QA/QC noted and/or described. Data quality is suspect or unknown.
	Land and Water Uses	Only has documentation of land and water use practices that might alter habitat	Temporal	Based on sporadic or singular observations. Period of record is incomplete.	Protocols	Data were not collected by trained individuals following appropriate protocols.
	Reference Condition	No attempt to compare to reference condition; observed impacts are likely to be natural			Relevance	Data are not relevant; habitat has likely changed significantly since the assessment was made.
	Source	No evidence of man induced impacts identified. Source is extrapolated from upstream or downstream condition.				
	Photographs	None.				

## HABITAT Sufficient & Credible Data Tables

<b>Category</b>						
<b>Level of Confidence in Data</b>	<b>Data Content</b>		<b>Data Coverage</b>		<b>Data Quality</b>	
	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>
<b>2</b>	Assessment	Visual observations of habitat characteristics were made with simple assessment. Direct visual observation of evidence of use by individual fish and wildlife species (e.g. spawning adults; tracks, bones, wildlife migration, nesting, animal scat). Anecdotal Historical information of use by species.	Spatial	Limited spatial coverage. Site specific studies.	QA/QC	Data precision and sensitivity are low.
	Land and Water Use	Use of land use and topographic maps, other reports to characterize watershed condition; probable sources of impairment are documented.	Temporal	Limited to annual visit and nonspecific to season.	Protocols	Qualified professional involved only through correspondence. Data were collected following appropriate protocols; however individuals had limited training.
	Reference Condition	Reference condition can be approximated by a qualified professional			Relevance	Data can be used to give an historical perspective for approximating reference condition or trends. It is unlikely that the habitat has changed significantly since the assessment was made.
	Source	Indirect evidence that problem is due to man induced impacts. Probable impairment causes are targeted and probable sources of impairment documented.				
	Photographs	Several photographs of Current channel, watershed, lake condition, waterbody are provided.				

## HABITAT Sufficient & Credible Data Tables

<b>Category</b>						
Level of Confidence in Data	<b>Data Content</b>		<b>Data Coverage</b>		<b>Data Quality</b>	
	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>
<b>3</b>	Assessment	Use of visual-based habitat assessment following standard SOPs (e.g., Stream Reach Assessment and PFC.) Assessment includes quantitative measurements of selected parameters. Species use documented by limited sampling.	Spatial	An attempt was made to access the stream reach, lake, or other type of waterbody wherever possible. Assessment is broad; often covering the entire stream reach or targeted portion of waterbody	QA/QC	Data has moderate precision and sensitivity.
	Land and Water Use	Data on land and water uses are used to supplement assessment	Temporal	Assessment during a single season the norm.	Protocols	Professional biologist performs survey or provides training. Professional biologist or hydrologist performs the assessment.
	Reference Condition	Reference condition can be determined with a reasonable degree of confidence and used as a basis for assessment.			Relevance	Data were collected recently or are very unlikely that the habitat has changed significantly since the assessment was made.
	Source	Direct evidence that problem is due to man induced impacts.				
	Photographs	Photographs of channel, watershed, lake, or other waterbody condition prior to alteration and current conditions are provided.				

## HABITAT Sufficient & Credible Data Tables

<b>Category</b>						
<b>Level of Confidence in Data</b>	<b>Data Content</b>		<b>Data Coverage</b>		<b>Data Quality</b>	
	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>	<b>Parameter</b>	<b>Description</b>
<b>4</b>	Assessment	Assessment of habitat based on quantitative measurements of instream parameters, channel morphology and floodplain characteristics, preferably under standardized and commonly used protocols. Designed quantitative sampling using established protocols.	Spatial	Assessment based on good access of the entire stream reach including private property. Helicopter surveys, etc.	QA/QC	High level of precision and sensitivity.
	Land and Water Use	Information and/or maps provided are relevant and sufficient to document water quality	Temporal	Data from multiple years.	Protocols	Assessment was performed by a highly experienced professional.
	Reference Condition	Reference condition is well understood and is used as the basis of the assessment.			Relevance	Data are current; There is no doubt that the assessment reflects current conditions and documents past conditions.
	Source	Direct evidence that problem is due to man induced impacts.				
	Photographs	Comprehensive historical photographs of channel, watershed, lake, and waterbody condition prior to alteration and current conditions are provided, including specific dates, ambient conditions and full descriptive documentation. Groundtruthing.				

**APPENDIX III: ACWA Ranking Parameters by Component & Assigned Scores**

<b>Water Quality</b>				
<b>Parameter</b>	<b>Score</b>	<b>Rating</b>	<b>Description of Rating</b>	<b>Considerations</b>
Allocation	1	Low	Few or no water quality allocations (e.g, no discharge permits or water quality certifications for other permits issued).	Review permits or authorizations issued or pending.
Allocation	3	Moderate	Some water quality allocations (e.g., a few minor discharge permits or certifications for minor projects issued).	
Allocation	5	High	Many water quality allocations (e.g., many or major discharge permits or certifications issued).	
Condition	1	Compliant	Water quality is in compliance with applicable standards.	Review available data and reports in relation to federal, state or local water quality regulations and ordinances.
Condition	3	Impaired (Low duration or severity)	Water quality does not comply with applicable standards for short periods of time or at low levels of severity.	
Condition	5	Impaired (High duration or severity)	Water quality does not comply with applicable standards for extended periods of time or at high levels of severity.	
Protection	1	Adequate protection	Protections currently in place are adequate to prevent degradation of water quality.	Assess effectiveness of existing stewardship programs, on-going water quality condition of waterbody and associated risks.
Protection	3	Moderate protection	Protections currently in place may not be adequate to prevent degradation of water quality.	
Protection	5	Inadequate protection	Protections currently in place are not adequate to prevent degradation of water quality.	
Future Use	1	Few (> 5 Years)	Few or no future water uses with potential to affect water quality. No discharge permits or water quality certifications for other permits issued or pending. No unauthorized activities that degrade water quality are documented.	Assess potential for increased uses, allocations and impacts.

Future Use	3	Some (1-5 Years)	Some future water uses with potential to affect water quality. Few or minor discharge permits or certifications issued or pending. Few or no unauthorized activities degrading water quality are documented.	
Future Use	5	High (0-1 Year)	Multiple or major future water uses with potential to affect water quality. Multiple or major discharge permits or certifications issued or pending. Unauthorized activities degrading water quality are documented.	
Present Use	1	Low use	Few beneficial uses are associated with water quality (e.g., not a drinking water source, no fish and wildlife production).	Assess current use of waterbody relative to maximum potential uses and pollution impacts.
Present Use	3	Moderate use	Some beneficial uses associated with water quality (e.g., fish and wildlife production, secondary drinking water source).	
Present Use	5	High use	Many or major beneficial uses associated with water quality (e.g., primary drinking water source for large population, salmon spawning and rearing).	
Value	1	Low Value	Private drinking water supply, no uniquely distinctive pristine qualities, administratively assigned designation or none.	Assess relative value of waterbody as a water source or supply for potential uses and any special designations.
Value	3	Moderate Value	Class C drinking water supply, moderately distinctive pristine qualities or assigned a regulatory designation.	
Value	5	High Value	Class A/B drinking water supply, uniquely pristine qualities or legislatively assigned designation.	

<b>Water Quantity</b>				
<b>Parameter</b>	<b>Score</b>	<b>Rating</b>	<b>Description of Rating</b>	<b>Considerations</b>
Allocation	1	None	No allocation of water in the watershed.	Examine water right files: volumes and locations. Examine types of use: consumptive vs. non-consumptive.
Allocation	3	Moderate	Volume of water allocated is small compared to amount of available water.	
Allocation	5	Near Maximum	Volume of water allocated is large compared to amount of available water.	
Condition	1	Not Impacted	Capable of providing for appropriated uses.	Examine effects of appropriated uses on available water. Examine flow data; lake level data; static water level data.
Condition	3	Moderately Impacted	Sometimes is not capable of providing for appropriated uses.	
Condition	5	Severely Impacted	Not capable of providing for appropriated uses.	
Protection	1	Adequate protection	Protections currently in place are adequate to maintain sufficient water volumes for existing appropriations.	Examine water use records, monitoring data associated with temporary water use authorizations, compliance with permit conditions.
Protection	3	Moderate protection	Protections currently in place may not be adequate to maintain sufficient water volumes for existing appropriations.	
Protection	5	Inadequate protection	Protections currently in place are not adequate to maintain sufficient water volumes for existing appropriations.	
Future Use	1	Few (> 5 Years)	No or few future water use applications are anticipated.	Examine number, types and location of pending applications for water rights, temporary water use, and instream flow reservations. Examine file of unauthorized uses.
Future Use	3	Some (1-5 Years)	Some future water use applications are anticipated.	
Future Use	5	High (0-1 Year)	Multiple or many future water use applications are anticipated.	
Present Use	1	Few	No appropriated use of water in the watershed.	Examine number, types and location of existing water rights, temporary water use
Present Use	3	Some	Some appropriated use of water in the watershed.	
Present Use	5	Many	Multiple or many types of appropriated use of water in the	

<b>Habitat</b>				
<b>Parameter</b>	<b>Score</b>	<b>Rating</b>	<b>Description of Rating</b>	<b>Considerations</b>
Allocation	1	Low	Few or no allocations involving habitat.	
Allocation	3	Moderate	Some allocations involving habitat (e.g., few or minor permits issued for habitat alteration).	
Allocation	5	High	Many allocations involving habitat (e.g., many or major permits for habitat alteration).	
Condition	1	Not Impaired	Habitat structure and functions are intact. Human influences are not important factors affecting habitat productivity, health, size, or quality.	
Condition	3	Impaired - Low	Low duration or severity of habitat degradation. Short-term effects on habitat structure and functions affecting productivity, health, size, or quality.	
Condition	5	Impaired - High	High duration or severity of habitat degradation. Long-term effects on habitat structure and functions resulting low productivity, health, size, or quality.	
Protection	1	Low	Protections currently in place are adequate to prevent degradation of habitat.	
Protection	3	Moderate	Protections currently in place may not be adequate to prevent degradation of habitat.	
Protection	5	High	Protections currently in place are not adequate to prevent degradation of habitat.	
Future Use	1	Low	Few or no threats to habitat. No permits issued or pending for habitat alteration. No unauthorized activities that degrade habitat are documented.	
Future Use	3	Moderate	Some threats to habitat. Few or minor permits issued or pending for habitat alteration. No unauthorized activities that degrade habitat are documented.	
Future Use	5	High	Multiple or major threats to habitat. Multiple or major permits issued or pending for habitat alteration. Unauthorized activities that degrade habitat are documented.	
Present Use	1	Low	Few beneficial uses derived from the habitat (e.g., not important for fish and wildlife production, hunting, fishing, or other activities).	
Present Use	3	Moderate	Some beneficial uses derived from the habitat (e.g., resident fish production, low-use subsistence fishery).	
Present Use	5	High	Many or major beneficial uses of the habitat (e.g., salmon spawning and rearing, waterfowl resting or feeding, wildlife viewing, major subsistence fishery).	
Value	1	Low	The habitat is not valued for particular uses or functions. Not a unique or special habitat, the habitat type is abundant in the region.	Productivity Health Extent Quality/Quantity
Value	3	Moderate	The habitat is valued for unique or special uses or functions that it serves. Habitat is not abundant in the area.	
Value	5	High	The habitat is highly valued for unique or special uses or functions that it serves. The habitat is not abundant in the area.	