STATE OF COLORADO

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TO: Colorado Water Conservation Board Members

FROM: Jacob Bornstein, Water Supply Planning Section

DATE: January 15, 2013

SUBJECT: **March 19-20 Board Meeting**
Agenda Item 23 – Nonconsumptive Toolbox

Summary:
Attached is the Draft Nonconsumptive Toolbox. The IBCC requested that CWCB develop a toolbox to help roundtables incorporate nonconsumptive needs into their Basin Implementation Plans. This is a resource document for the roundtables and other stakeholders, and brings many documents and technical work together in one place.

The main report is provided and additional appendices are available online here: http://cwcbweblink.state.co.us/weblink/0/doc/170187/Electronic.aspx?searchid=ee0c3336-ec13-43aa-8b81-460b87f065af

The report has the following components:

- Introduction
- Overview of the Nonconsumptive Needs Toolbox
  - Step A. Basin-wide Goals
  - Step B. Measurable Outcomes
  - Step C. Needs and Opportunities
  - Step D. Decision Process
    - Example Decision-Making Template
    - Example Challenge Statements
- References
- Appendices
  - Appendix A Scientific Information Related to Environmental Attributes
  - Appendix B Examples of Measurable Outcomes
  - Appendix C Tools and Resources for Project Planning
  - Appendix D Projects and Methods Mapping
  - Appendix E Nonconsumptive Projects and Methods Funding Opportunities
  - Appendix F Case Studies
  - Appendix G Existing Programs

Discussion
The toolbox was reviewed by the IBCC's nonconsumptive subcommittee, which includes members of the environmental community, the Front Range Water Council, and others. Based on this review, along with internal reviews by the Intersate & Federal, Water Supply Planning, Watershed & Flood Protection, and Stream & Lake Protection sections, staff believes the toolbox is ready for public review.

Some concern was expressed about the purpose of the document. Staff clarified in the document that it is not a policy document, but instead a resource to assist roundtables in planning for their nonconsumptive needs.

In order to assist roundtables in developing their Basin Implementation Plans over the course of the summer, staff would like for the toolbox to be finalized at the May CWCB meeting.

Subsequently, staff plans to present the finalized toolbox document along with other supportive material for the consumptive aspects of the Basin Implementation Plans to the basin roundtables in support of their basin planning efforts.

Staff Recommendation:
Open a forty five (45) day public review period for the Nonconsumptive Toolbox upon completion of the CWCB board meeting.

DRAFT
REPORT

Nonconsumptive Toolbox

Colorado Water
Conservation Board

March 2013

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Acronyms

BLM	U.S. Bureau of Land Management
CPW	Colorado Parks and Wildlife
CWCB	Colorado Water Conservation Board
HB	House Bill
IBCC	Interbasin Compact Committee
ISF	instream flow
RICDs	Recreational In-Channel Diversions
SWSI	Statewide Water Supply Initiative
Toolbox	Nonconsumptive Needs Toolbox

Colorado Water Conservation Board

Nonconsumptive Needs Toolbox

Introduction

In 2005, the Colorado General Assembly passed the Colorado Water for the 21st Century Act[1] (House Bill [HB] 05-1177) (**Figure 1**). The Act established a framework to provide a permanent forum for broad-based water discussions. The process created a voluntary, collaborative process to help the State of Colorado address its water challenges. The Act also created nine basin roundtables and an Interbasin Compact Committee (IBCC). Because environmental and recreational attributes are important to the State of Colorado and to the quality of life for Colorado's citizens, the Water for the 21st Century Act explicitly called out the need to plan for future environmental and recreational uses in water supply planning. Environmental and recreational uses of water are referred to as nonconsumptive uses in the Water for the 21st Century Act.

Based on the recommendations of its Nonconsumptive Subcommittee, the IBCC recommended the following nonconsumptive implementation activities on November 30, 2011:

1. Action request for the basin roundtables:

    a. Develop Nonconsumptive Implementation Plan: Building on information previously compiled for the Statewide Water Supply Initiative (SWSI) 2010, identify nonconsumptive geographic and/or seasonal gaps and then suggest and prioritize projects and methods that can fill those gaps in a strategic manner. Using the Toolbox described below, the projects should identify initial cost estimates, potential partners, and whether any entity has agreed to take the lead.

    b. Initiate three to five nonconsumptive projects: Using the basin's Nonconsumptive Identified Projects and Processes list, determine how to implement three to five projects or methods that meet identified nonconsumptive needs.

> **37-75-104 (2)(c)** … develop a basinwide consumptive and nonconsumptive water supply needs assessment, conduct an analysis of available unappropriated waters within the basin, and propose projects or methods, both structural and nonstructural, for meeting those needs and utilizing those unappropriated waters where appropriate. Basin roundtables shall actively seek the input and advice of affected local governments, water providers, and other interested stakeholders in establishing its needs assessment, and shall propose projects or methods for meeting those needs.
>
> **37-75-102** … this article is not intended to restrict the ability of the holder of a water right to use or dispose of that water right in any manner permitted under Colorado law.

Figure 1. Excerpts from HB 05-1177, Colorado Water for the 21st Century Act

[1] http://cwcbweblink.state.co.us/weblink/0/doc/105662/Electronic.aspx?searchid=8e74cfe0-f62c-48bb-9fd7-8b193489faf0

c. Identify one or more pilot projects that integrate nonconsumptive projects/needs with consumptive projects/needs. The pilot project can count as one of the three to five nonconsumptive projects as long as it clearly meets a nonconsumptive needs gap.

d. Define technical questions related to nonconsumptive needs that need to be answered in your basin. These are questions that can be queried in the nonconsumptive database, such as how many projects are supporting a particular attribute, or additional technical questions such as those concerning how a portfolio may affect flows in a given reach, etc.

2. The Colorado Water Conservation Board (CWCB) will develop a Toolbox for nonconsumptive needs, starting with a list of what resources are already available to inform the above discussions and how to access those resources; this will include summaries of a mapping exercise in the Southwest Basin and a modeling exercise in the Yampa-White-Green Basin.

Overview of the Nonconsumptive Needs Toolbox

The Nonconsumptive Needs Toolbox (Toolbox) was created to support efforts of the basin roundtables and other stakeholders to develop projects and methods to meet nonconsumptive needs and the Toolbox has two main objectives:

1. To serve as a guide for basin roundtables as they develop their nonconsumptive implementation plans. The tools and resources can help roundtables and other stakeholders develop and execute their long-term nonconsumptive implementation plans and specific projects in a strategic fashion to meet the nonconsumptive needs each roundtable identified.

2. To be a clearinghouse for data and information generated in Phases I and II of the nonconsumptive needs assessment process by compiling the work of the roundtables in one place.

The Toolbox framework is organized around four steps (**Figure 2**), which may provide some of the resources and information to encourage comprehensive planning for nonconsumptive needs in each basin. The Toolbox also aids in identifying needs for project implementation, analyzing information, devising plans, and making decisions in light of existing water policies, laws, and regulations. It provides a framework to evaluate existing information and identify opportunities and challenges toward implementation of nonconsumptive projects. The Toolbox includes tools that can be applied during project planning and implementation, programs that can be used to meet nonconsumptive needs, and cost estimates for common project types.

The Toolbox is a guidance or resource document and contains some of the resources and procedures that may support the assessment of nonconsumptive needs and projects. Other current and future resources and evaluation tools that are not described herein may also provide valuable support in the assessment of nonconsumptive needs. Each tool may or may not be applicable, in its current form, to any site-specific set of facts in question.

This is not a policy document of the CWCB. The intent of the document is to provide a compilation of information for use by the basin roundtables and others as they address nonconsumptive needs and implementation of nonconsumptive projects and methods. As the basin roundtables or project proponents consider use of the tools described in this document they will need to consider the applicability and limitations of the tool that may apply to the issue they are addressing.

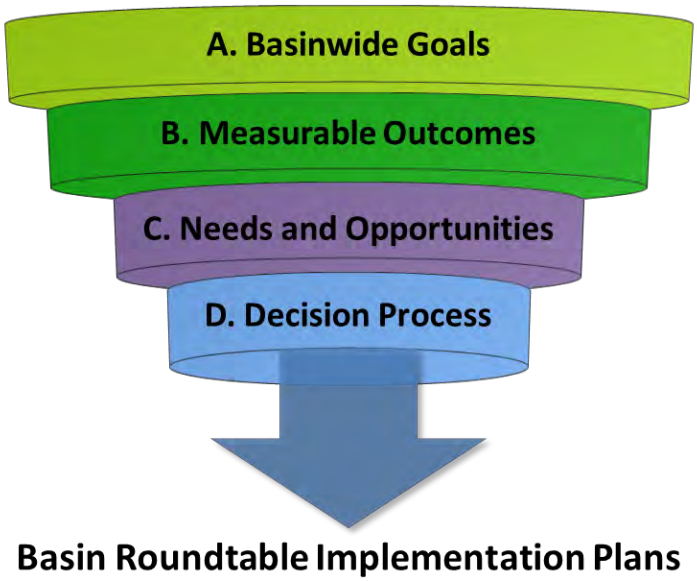

Figure 2. Overview of the Nonconsumptive Implementation Planning Process

Using the Toolbox consists of the four fundamental actions. Each action outlines a step in producing a comprehensive basin roundtable implementation plan. These actions are discussed in more detail and serve as the organizing framework for the Toolbox.

Step A. **Basinwide Goals:** Develop basin-level goals for the mapped attributes identified in the Statewide Nonconsumptive Needs Assessment Focus Area Map.

Example: Maintain population of native fish species so that none are listed in our basin.

Step B. **Measurable Outcomes:** Establish quantifiable, measurable outcomes for nonconsumptive targets and attributes

Example: Sustain 10 populations of bluehead sucker in 10 different river locations.

Step C. **Needs and Opportunities:** Using the project and methods database, identify needs and opportunities for protecting targets and attributes and strategically plan to meet those nonconsumptive needs.

Example: Based on analysis of existing levels of protection and where attributes occur, only five populations of bluehead sucker are protected. As a result, we need to protect an additional five populations to meet our established measurable outcomes.

Step D. **Decision Process:** Use the decision template to determine what actions need to be taken to meet nonconsumptive needs and implement projects.

Example: For one of the five locations where protection of bluehead sucker populations is limited, moving through the decision template may lead to the determination that reservoir reoperation could achieve desired outcomes.

While these actions are called "steps," not every roundtable will start at the top and work their way down the list sequentially. For some roundtables it may be appropriate to focus on one or two of the steps. Also, each of the steps may inform the other three and there may be interaction between the steps.

The Toolbox can be utilized to help develop near-term and long-range plans for meeting goals and implementing projects on the ground. At the basin scale, the tools can be used to help develop a basinwide strategic approach for meeting nonconsumptive needs and developing specific measurable outcomes for environmental attributes and conservation targets. At the local level, water resource managers may be able to use the tools and other resources to directly address specific project needs.

Step A. Basinwide Goals

The first step toward devising a basin roundtable implementation plan is to develop basinwide goals that specify environmental and recreational targets. These goals will serve as the foundation for a strategic framework to guide current and future nonconsumptive project planning.

Examples of basin-scale goals and objectives include:

- Improve conditions in the basin for all fish species on the federal candidate species list to prevent additional threatened and endangered species listings
- Maintain all habitat for fish species on the state imperiled list in the basin
- Maintain important fishing and whitewater opportunities in the basin

To improve conditions usually entails a restoration project. These projects are often more expensive than projects that protect or maintain existing conditions, but may be needed for high priority attributes or locations. In areas with competing water needs, management actions or limited protection may be the only way to balance multiple uses of a river or stream.

In order to help determine the goals, roundtables may turn to the nonconsumptive needs maps, which indicate what species and attributes are in the basin and where they are. To date, basin roundtables have conducted an extensive inventory, analysis, and synthesized mapping effort to establish baseline data and catalog nonconsumptive attributes across the state (**Figure 3)**. The mapping information was summarized in the SWSI 2010 Final Report, Section 2, Figure 2-3; the complete Section 2 can be downloaded from the CWCB website.[2] For this effort, the basin roundtables utilized environmental and recreational mapping to identify nonconsumptive focus areas in their basins. The focus area maps developed by each basin roundtable are based on a common set of environmental and recreational attributes and denote where Colorado's important water-based environmental and recreational attributes are located. Additional scientific information that relates to the environmental attributes identified by the roundtables is detailed in **Appendix A**.

[2] http://cwcb.state.co.us/water-management/water-supply-planning/Pages/SWSI2010.aspx

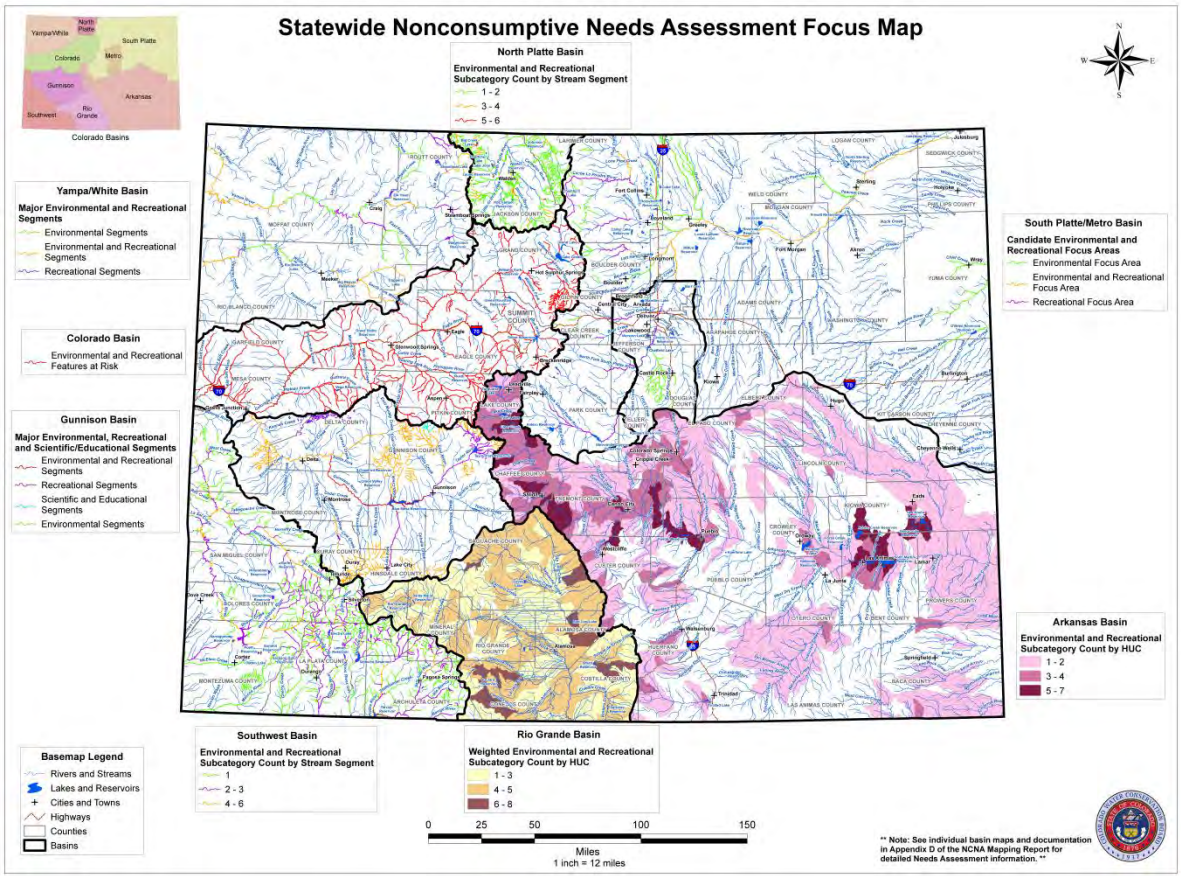

Figure 3. Statewide Nonconsumptive Needs Assessment Focus Area Map

The statewide map, the individual basin maps, and accompanying information can be found on the CWCB SWSI 2010 website, under SWSI 2010 Full Final Report, Appendix C.[3] The basin maps are designed in such a way that users can select a stream reach or focus area and determine what species and other attributes are associated with it. Directions for how to use these "geo pdfs" are available in Section 2 – Nonconsumptive Needs Assessments.[4]

This map information along with the Colorado Parks and Wildlife (CPW) species management plans and the Colorado Natural Heritage Program's goals, can serve as tools for developing goals and objectives at the basin-scale for nonconsumptive attributes. After the basin roundtables develop goals and objectives, the next step is to identify measurable outcomes for their goals.

The focus area maps developed by each basin roundtable are based on a common set of environmental and recreational attributes and represent where Colorado's important water-based environmental and recreational attributes are located. The maps are reflective of stakeholder input for the focus areas and also reflect stream reaches and subwatersheds with higher concentrations of environmental and recreational qualities. These maps were generated to provide information to the basin roundtables on important environmental and recreational areas in their basins but were not intended to dictate future actions. It should be noted, and as will be shown in this section, that this

[3] http://cwcb.state.co.us/water-management/water-supply-planning/Pages/SWSI2010.aspx
[4] http://cwcb.state.co.us/water-management/water-supply-planning/Documents/SWSI2010/SWSI2010Section2.pdf

effort has not identified all streams as important. The Nonconsumptive Needs Assessments are not intended to create a water right for the environment and will not diminish, impair, or cause injury to existing absolute or conditional water rights. The CWCB developed the environmental and recreational focus area mapping for the following purposes:

- The maps are intended to serve as a useful guide for water supply planning to enable coordination on future projects and to help avoid future conflicts between meeting consumptive, environmental, and recreational needs
- The maps can assist in identifying the status of environmental and recreational water needs, including reaches where needs are being met, where additional study is needed, and where proposed implementation projects in the basin have been identified
- The maps can help basins plan for the water needs of species of special concern so that they do not become federally listed as endangered or threatened in the future
- The maps can provide a basis for collaborative efforts for future multi-objective projects

Step B. Measurable Outcomes

Once environmental and recreational attributes have been identified and basinwide goals established, the next step of formulating a nonconsumptive implementation plan is to formulate measurable outcomes for environmental and recreational attributes based on the basin roundtable goals. A measurable outcome is a statement that articulates—in measurable or quantifiable terms—the desired state of an attribute as a result from an action or decision, such as:

- Maintain 80 percent of cutthroat trout habitat or population levels in subbasin Y
- Increase habitat or population levels for candidate species by 15 percent in the basin
- Protect the two populations of northern redbelly dace in subbasin X

Measurable outcomes should be identified at both the local-scale (project level) and at the basin-scale (regional strategy). The process of developing measurable outcomes should involve stakeholders with a diverse range of interests. Projects should be planned both proactively and strategically to address current and future issues. Basin roundtables should encourage a comprehensive suite of projects to meet basinwide goals, develop an approach to identifying the most important projects, and emphasize adaptive management around clear, measurable environmental goals. Actions should be based on sound science. The results of these actions should be monitored to measure results and inform future projects.

Listed below are some of the organizations and programs that can serve as resources and examples as each has identified specific measurable outcomes:

- Colorado Natural Heritage Program
- The Nature Conservancy
- Southern Rocky Mountains – An Ecoregional Assessment and Conservation Blueprint
- 2006 Central Shortgrass Prairie Ecoregional Assessment and Partnership Initiative
- American Whitewater Flow Surveys
- Colorado's Wildlife Action Plan
- Colorado Recovery and Conservation Plans
- Range-wide Conservation Agreement and Strategy

- Upper Colorado River Endangered Fish Recovery Implementation Program
- Routt County Livability Index

The specific measurable outcomes developed by these organizations and programs are detailed in **Appendix B**. Other programs and examples also exist and the examples above should not be interpreted as an endorsement by the CWCB of the specific goals, objectives or processes of the above programs.

The examples of measurable outcomes described in **Appendix C** can assist the basin roundtables in developing goals and objectives for their attributes as well as developing measurable outcomes. Many methods to measure nonconsumptive outcomes have been developed and as the basin roundtables or project proponents consider use of the tools described in this document they will need to consider the applicability and limitations of the tool that may apply to the issue they are addressing.

To determine the outcomes of a project, baseline information is often required. Technical and scientific tools can be used to help define ecological baselines, such as current flow levels through a fishery or existing riparian habitat. The information used to identify scientific baselines can also be utilized in establishing metrics to evaluate whether a desired outcome is being achieved. Some commonly used tools for collecting scientific information for environmental and recreational attributes are detailed in **Appendix C**. Baseline environmental data such as streamflow, water quality, fish survey, the extent and condition of riparian habitat are often not available to establish baseline conditions or allow the measurement of outcomes. In many instances, the collection of additional field information may be required to establish the baselines and outcomes described in Appendix C.

Step C. Needs and Opportunities

Once attributes have been assessed for the basin and measurable outcomes established, the next step is for basin roundtables to survey existing and planned projects and methods and identify needs and opportunities to meet measurable outcomes. This step in the planning process is focused on conducting analysis to identify gaps in nonconsumptive needs, determine protection statistics, and consider project funding sources to devise comprehensive roundtable implementation plans. Roundtables may want to explore the existing and planned projects and methods for a given attribute before determining measurable outcomes (Step B).

As a follow-up to the focus mapping, in January 2010 CWCB developed a survey to collect information on existing and planned nonconsumptive projects, methods, and studies for Phase II from nonconsumptive project proponents. The responses from this effort were put into a database and mapped. Roundtables can work with CWCB staff to ask questions about the locations of planned and existing projects and level of protection for a given attribute. This will help roundtables focus on locations that may be most strategic for executing nonconsumptive projects and methods.

This data gathering effort was parallel to a similar survey used to gather data from municipal project proponents, and is summarized below.

The nonconsumptive survey data was compiled into a nonconsumptive needs projects and methods database.[5] Studies were included, as they may recommend or inform the implementation of projects

[5] http://cwcb.state.co.us/environment/non-consumptive-needs/Documents/NCNAMappingAppendices.pdf

or methods that will provide protection or enhancement of environmental and recreational attributes. This survey was distributed through CWCB's basin roundtable and email list.

On February 10, 2010, CWCB conducted a workshop in Silverthorne, Colorado to discuss the Phase II efforts and to collect information on nonconsumptive projects, methods, and studies from the workshop attendees. In addition, CWCB gathered information from additional individuals and organizations to follow up with the data collection effort. Since the February 2010 meeting, an additional 57 meetings were held to gather data on additional projects, methods, and studies, as shown in **Table 1**. CWCB and the technical team supplemented the survey data with information from CWCB's grant programs, instream flow (ISF) program, and levels of protection afforded by land management practices on public and private lands.

Table 1. Summary of Basin Roundtable Nonconsumptive Project and Methods

Basin Roundtable	No. Projects and Methods in Focus Areas	No. Projects and Methods Outside Focus Areas	Total No. Projects and Methods[1]
Arkansas	40	0	40
Colorado	168	35	203
Gunnison	44	15	59
Metro	See South Platte	See South Platte	See South Platte
North Platte	41	7	48
Rio Grande	59	0	59
South Platte	54	53	107
Southwest	84	10	94
Yampa-White	22	16	38
TOTAL	**512**	**136**	**648**

[1] Total does not include all CWCB-funded projects and ISFs

In addition to identifying the spatial extent and status of the identified projects and methods, CWCB also examined what type of protection the project or method may provide to a given environmental or recreational attribute. CWCB has classified the projects as having direct or indirect protections based on a given environmental or recreational attribute. The definitions used for direct and indirect protections are as follows:

- **Direct Protection** – Projects and methods with components designed intentionally to protect a specific attribute. For example, ISFs provide direct protection of fish attributes. Additionally, restoration of a stream channel would provide direct protection of aquatic species.
- **Indirect Protection** – Projects and methods with components that were not designed to directly protect the specific attribute but may still provide protection. For example, flow protection designed to benefit a fish species may also indirectly protect riparian vegetation that is located in the protected stream reach. Other examples include protective land stewardship or a wetland or bank stabilization effort that could indirectly protect aquatic species.

These direct and indirect protections can be analyzed by river, basin, or at the statewide level as they relate to environmental and recreational attributes. **Figure 4** shows an example of an analysis for cutthroat trout, state threatened and endangered warm water fish, and riparian and wetland areas. In this example, cutthroat trout have the highest percentage of direct protections (38 percent). Riparian and wetland areas have the highest percentage of stream miles with no known protections (73 percent) and very few miles with direct protections (4 percent). With this baseline information collected, the next step is for the basin roundtables to analyze those data to develop measurable outcomes to achieve their goals related to these attributes.

In combination, the Focus Maps and the projects and methods database provide a point from which roundtables and other stakeholders can devise a strategic, comprehensive plan that sets targets and measurable outcomes for protecting nonconsumptive attributes. To start, roundtables should ask what they want to achieve for each of the river segments on their Focus Maps. Is the measurable outcome to sustain all attributes in all focal segments? Are there some attributes or segments that are more important than others? Are there attributes that will be maintained or improved only on an opportunistic basis?

Next, maps of projects and methods for each basin can be superimposed on top of the Focus Maps. **Figure 5** provides an example map from overlaying the projects and methods database on the Focus Maps for a portion of the Southwest Basin. Segments shown in red are roundtable-identified focus segments that have no known protections on them. Roundtable members or other stakeholders may want to identify what types of projects or methods could be implemented on these segments to sustain the nonconsumptive values. **Appendix D** contains similar maps for all basins.

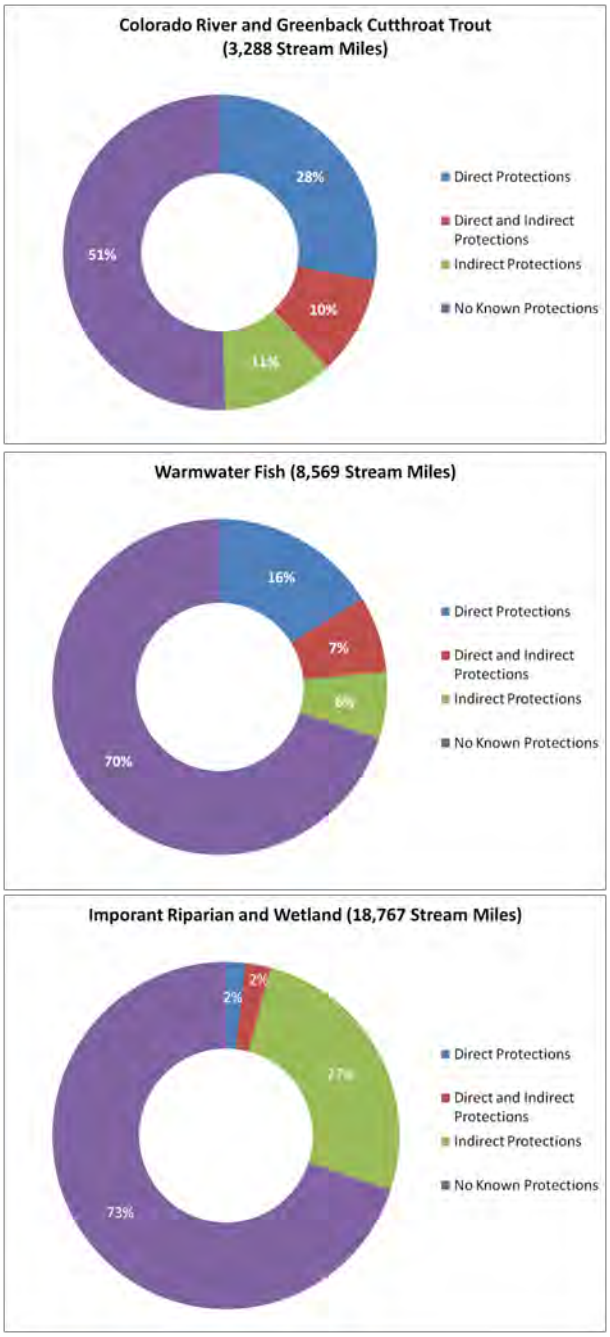

Figure 4. Statewide Direct and Indirect Protections

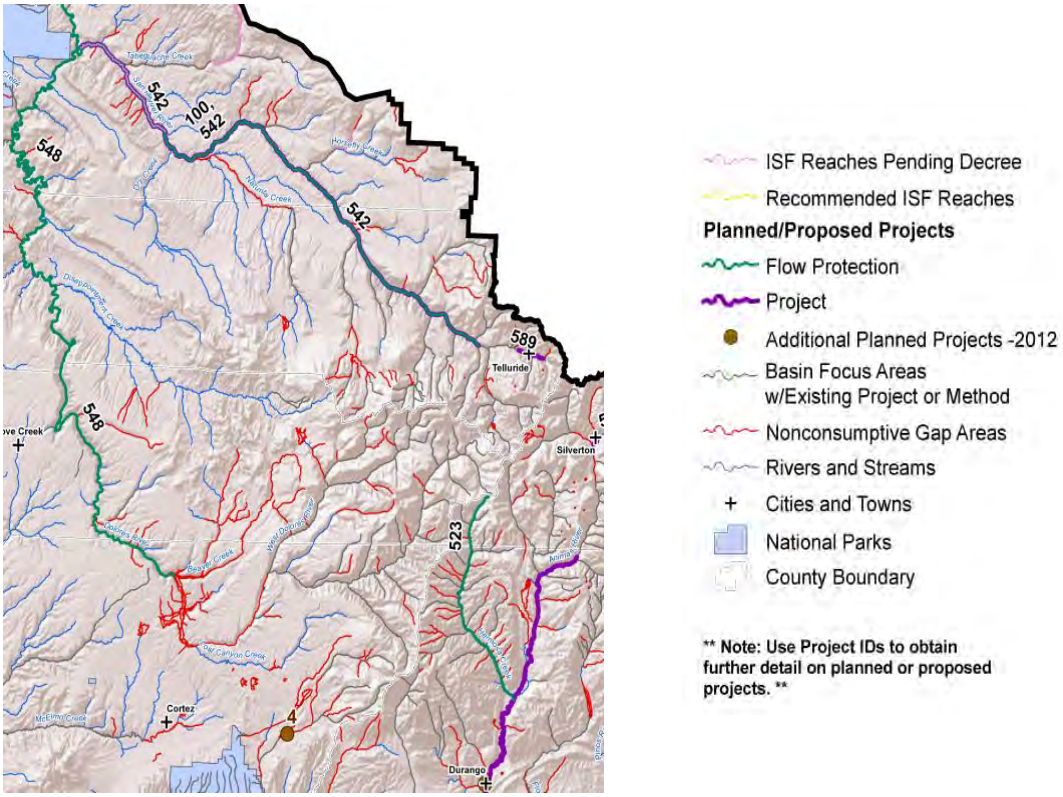

Figure 5. Close-up of Mapping Detail in the Southwest Basin

This overlay enables the users to ask a series of questions such as:

- For each focus segment, are there protections in place for the attributes?
- If protections are in place, are they sufficient to maintain/sustain the attributes?
- If protections are either insufficient or are not present, what additional action can be taken to maintain the attributes?

Step D. Decision Process

The decision tree in **Figure 6** can be used to identify what should be done to ensure the long-term maintenance of an environmental or recreational attribute on a specific stream reach, which may have been identified through Step C. These actions should support basinwide goals (Step A) and measurable outcomes (Step B). The decision tree was developed in partnership with the Colorado Basin Roundtable to assist in determining what types of projects or methods may be needed in a given reach. It emphasizes the types of protection or restoration that may be needed for a given water body. Examples of restoration activities include improving habitat, water quality, or flow conditions in a given reach. For water body protection, projects and methods could include policy mechanisms or voluntary agreements. The flow chart illustrates that there are many different options for developing nonconsumptive implementation plans and completing projects and methods for nonconsumptive needs in the future.

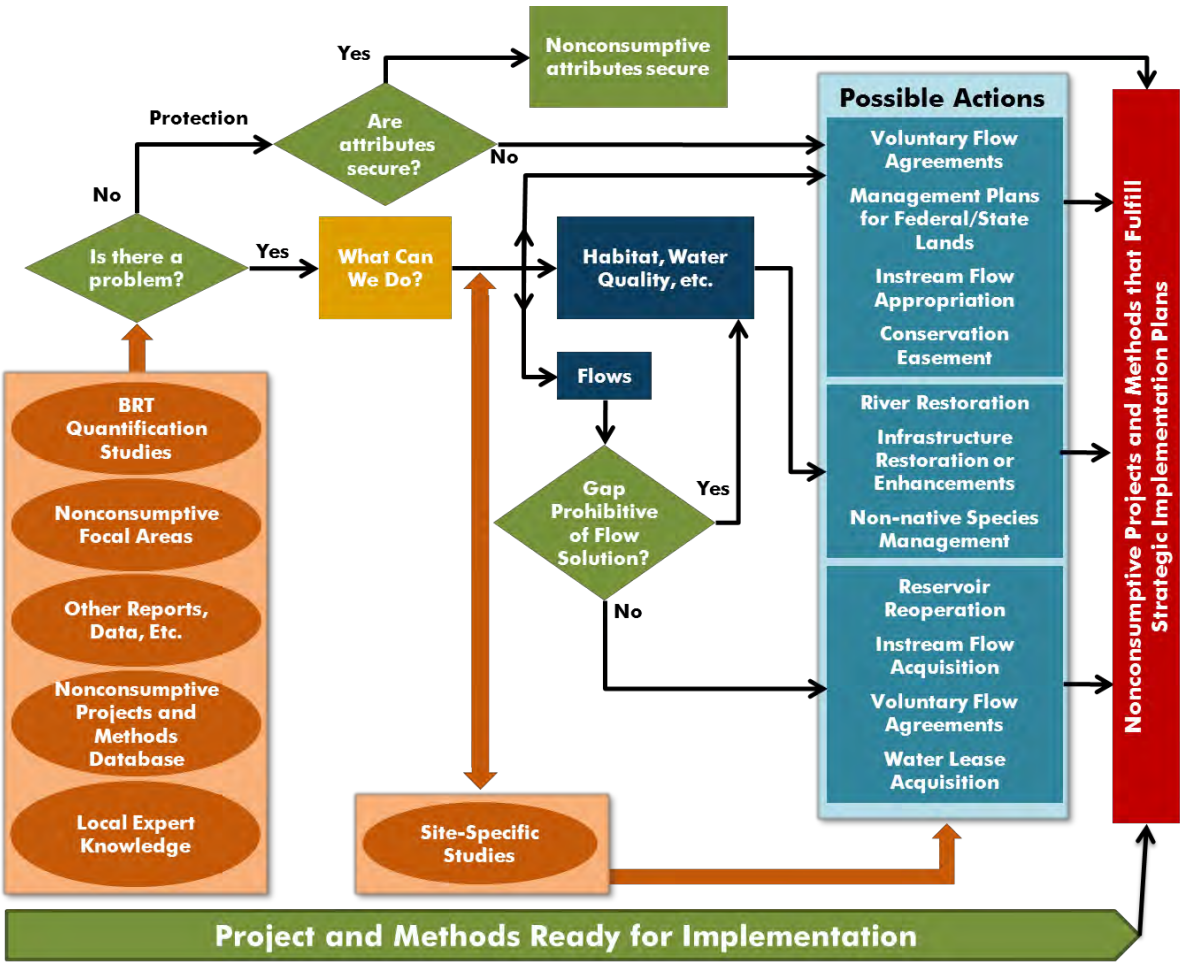

Figure 6. Decision Tree for Planning and Implementing Nonconsumptive Projects

If a roundtable chooses to develop its implementation plan, this decision tree might be applied to a mapped focus area where an environmental or recreational attribute is present. In this case, the decision tree could guide the practitioner to an understanding of what actions are needed in relevant focus segments or locations across the entire watershed. Alternatively, the decision tree can be used on an individual stream segment to identify what should be done in that segment.

Although significant information has been gathered, there may be segments or locations with environmental or recreational attributes where there remains insufficient information to answer the first question in the decision tree: Is there a problem? In this case, the science tools can be used to understand what attribute(s) may be at risk, but actual monitoring of ecological and recreational indicators may be required to identify the extent to which an attribute exists, if an attribute is of concern and the actual factors impacting the attribute.

The template in the following section illustrates how to walk through the decision tree to make choices about possible actions to meet nonconsumptive needs. This template demonstrates the process by first isolating each node in the decision tree and describing its intention. At each node, one or more tools can help with understanding where and how one can proceed to meet nonconsumptive needs. The template indicates the level of information that should ideally be used in developing each project.

Immediately following the template is a series of example "challenge statements." These challenge statements enter the decision tree at the node labeled "Is there a problem?" The challenge statement itself provides the answer to that question, thereby assuming that much is already known about the attributes in the stream, river, wetland, or reservoir being considered.

There are various funding options to support implementation of nonconsumptive projects and methods. These funding sources are described in **Appendix E**. **Appendix F** contains case studies that utilize the template below to provide examples on implementing nonconsumptive projects and methods. **Appendix G** summarizes existing programs that are available to assist in the implementation of nonconsumptive projects and methods at the local, state, and federal level.

Example Decision-Making Template to Use in Basin Implementation Plans

Collect background on environmental and recreational attributes, protections, and gaps.

STEP 1: Challenge/Problem Statement: Identify the problem and create a challenge statement that identifies the attributes affected.

STEP 2: Decision-Making Process: Participation by a broad group of stakeholders is a vital component of assuring that the problem is adequately identified or that the attributes are secure. The stakeholder group would help determine whether additional work is needed to clarify the issue or contributing factors.

A. **Assembling Stakeholder Group:** Develop a plan to engage diverse stakeholders, including, but not limited to, watershed groups, agricultural water users, water suppliers, municipal entities, and conservation groups.

B. **Issue Clarification / Contributing Factors:** Refer to site-specific studies, pilot projects, stakeholder review processes, reliance on expert opinion, etc. to clarify the issues and identify contributing factors.

STEP 3: Identify Measurable Outcomes: What can we do? What are the local-scale measurable outcomes? How do these fit into basin- and state-level goals? What tools can we use? A measurable outcome is a statement that articulates—in measurable or quantifiable terms—the desired state of an attribute as a result from an action or decision.

C. **Identify Attributes:** What are the observed and measured ecological or recreational attributes of the reach? Is there adequate protection of those attributes?

D. **Choosing the right tool(s) to address the challenge:** After reviewing and evaluating available tools, seek stakeholder agreement on which tool is (1) most appropriate to address the challenge or problem, and (2) will achieve the best results.

- **Tool 1:** Describe the tool and why it was chosen, e.g., channel reconfiguration
- **Tool 2:** Describe the tool and why it was chosen, e.g., ISF

STEP 4: Categorize Information Needs.

E. **Identify possible actions:** Describe science and what types of ecosystem structure/function needs to be addressed.

STEP 5: Implementation Process: This may need to be repeated for each tool.

Implementation Plans

F. **Planning/Assessment:** Describe planning/assessment process, including any site-specific studies that are needed and the costs associated with it, including potential sources of funding.

G. **Design:** Describe the design process, including any site-specific studies that are needed and the costs associated with it, including the sources of funding. Design may include several steps, such as 30 percent, 60 percent, and final design.

H. **Permitting:** Permitting process, including the costs associated with it and the sources of funding. Include a list of the local, state, and federal permits that were needed.

I. **Construction:** Describe construction process, including the costs associated with it and the sources of funding.

Monitoring: Include the scope, final results and the benefits of the project. Describe pre-, post-, and long-term project monitoring. Include pre- and post-project photos.

Nonconsumptive Projects and Methods

Example Challenge Statements

The following challenge statements are provided as examples for practitioners who are ready to determine what types of actions are most desirable to restore or maintain specific attributes. Each example serves as a type of "story problem" and then moves through the decision tree to determine what types of methods might serve to meet a measurable outcome. These challenge statements are based on the assumption that the practitioner already has some understanding of existing baseline conditions. The decision tree guides practitioners through project planning and the implementation process after baseline conditions have been inventoried and environmental and recreational attributes have been assessed.

1) There is a degraded population of an imperiled aquatic species (federal- or state-listed threatened or endangered species, candidate for federal listing, state-listed species of special concern) or recreational fishery:
   a. Include existing protections of these species in your implementation plan.
   b. Is the problem habitat-related? If so, what types of habitat improvements are needed? Some examples include:
      i. Riparian habitat improvements – bank restoration that affects temperature or water quality concerns, such as bank stabilization and vegetation plantings.
      ii. Instream habitat improvements – restoration, such as j hooks, pool rocks, assisting with rock embeddedness.
      iii. Reservoir reoperation – modify reservoir operations to address habitat needs; examples include re-timing of releases or adjusting the temperature of releases, as needed.

c. Is the problem flow-related? If so, what types of flow adjustments are needed? Some examples include:

   i. Infrastructure restoration/enhancement – install a more efficient headgate or ditch system so less water needs to be diverted.

   ii. Voluntary flow agreement/reservoir reoperation – Work with local water provider stakeholders to determine if there is an opportunity to re-time reservoir operations or create additional flows for the degraded aquatic species.

   iii. Instream flow acquisition – Work with a willing local water rights holder to donate, lease, and/or sell all or a portion of their water right. These water rights can only be held by the CWCB, so it is necessary to work with CWCB staff.
   NOTE: The Colorado Water Trust is a nonprofit whose mission is to help with flow-related restoration efforts and may be able to help.

d. Is a flow solution not feasible due to lack of available water?

   i. Channel Reconfiguration – Modify the channel morphology to accommodate lower flows while still providing for a healthy stream.

2) There is a healthy population of an imperiled aquatic species or recreational fishery:

   a. Include existing protections of these species in your implementation plan.

   b. If additional protection is needed, consider:

      i. ISF or natural lake level appropriation – work with CWCB (1) to establish an ISF; (2) to increase an existing ISF water right to meet the needs of the imperiled aquatic species; or (3) to acquire water for ISF use. CPW or the U.S. Bureau of Land Management (BLM) may be partners who can help conduct site-specific flow studies necessary for an ISF appropriation or increase.

      ii. Land management protections – if the attribute is located on state or federally owned land that is not currently being managed to protect the attribute, consider working with the state or federal owner to incorporate protective measures into the land management plan. If the reach is on privately owned land, contact the land owner to explore the possibility of establishing a conservation easement.

      iii. Wild & Scenic River Stakeholder Group process – if the reach containing the attribute is on the Wild & Scenic eligible or suitable list, consider working with an existing Wild & Scenic River Stakeholder Group to consider alternatives to a Wild & Scenic designation for protection of the attribute. If a stakeholder group is not currently in place, consider working to establish one.

      iv. Gold Medal stream designation – work with CPW to establish the reach as a Gold Medal fishery.

      v. Voluntary flow agreement – consider working with existing water rights owners to develop an agreement to establish voluntary flow improvement mechanisms.

3) There is a degraded rare riparian or wetland plant community:

   a. Include existing protections of this plant community in your implementation plan.

   b. Is the problem habitat-related?

i. Riparian/wetland habitat improvements – bank restoration that affects temperature or water quality concerns, such as bank stabilization and vegetation plantings.

c. Is the problem flow-related?

i. Infrastructure restoration/enhancement – see 1.b.i.

d. Is a flow solution not feasible due to lack of available water?

i. Channel reconfiguration – Modify the channel morphology to accommodate the new low-flow channel and still provide for a healthy stream.

4) There is an outstanding example of a riparian or wetland plant community:

a. Include existing protections of these species in your implementation plan.

b. If the plant community is not protected, consider:

i. Management plan with government entity that owns the property – If the property is owned by CPW, the U.S. Forest Service, or the BLM, consider working with them to protect the area.

ii. Conservation easement – If the property is privately owned, a conservation easement could be considered. Conservation easements can even specify how the water is managed on the property.

iii. ISF or natural lake level – See 1.c.iii.

5) There is a reach of river that is overused by anglers or boaters:

a. Develop fee/license structure.

b. Educate commercial outfitters and clients on best practice.

c. Improve access point infrastructure (this could help with riparian habitat as well).

d. Develop better access to neighboring streams that are currently underutilized.

6) There is an outstanding recreational (boating or fishing) river reach:

a. Include existing protections of the recreational values in your implementation plan.

b. If it is not protected, consider:

i. Wild & Scenic alternatives.

ii. Federal or state management plans.

iii. Recreational In-Channel Diversions (RICDs).

iv. Access easements.

v. Improved access infrastructure.

vi. Work with CPW to designate a recreational area (i.e., the Arkansas Headwaters Recreational Area through state parks).

7) There is an underutilized recreational reach, which has the potential to attract needed tourism dollars to a particular community:

a. Improve access points.

b. In-channel improvements – Develop a whitewater park (if boating related) or improve fishery.

c. Develop and distribute a guide to publicize the recreational reach.

d. Gold Medal Trout Fishery Designation.

References

Colorado Water Conservation Board (CWCB). 2011. Statewide Water Supply Initiative 2010. CDM Smith, Denver, Colorado.

Stalnaker et al. 1995. The instream flow incremental methodology: a primer of IFIM. Biological Report No. 29, National Biological Service, U.S. Department of the Interior, Fort Collins, Colorado.