

Pathfinder Project Steering Committee Report

Strategies for Instream Flow Management

The Pathfinder Project is a pilot program initiated by the Grand Mesa, Uncompahgre, Gunnison (GMUG) National Forests whose purpose is to provide external ideas, perspectives and options related to strategic planning for, and implementation of instream flow protection on National Forest lands.

The Forest Supervisor for the GMUG National Forests convened a meeting in May 2000 to bring together representatives from various stakeholder groups that traditionally have been involved with water resource issues on the GMUG National Forests to help address instream flow needs and strategic protection strategies that could assist the Forest Service in its Forest Plan revision process.

The Forest Service has federal authorities to manage resources including water resources for multiple-use, sustained yield and to protect environmental values¹. The Pathfinder Project attempted to resolve the contentious issues related to “bypass” flow (whereby the Forest Service requires that a quantity of the decreed diversionary water remain in a stream) authorities as defined in these statutes by offering constructive alternatives to achieve the Forest Service’s mandated outcomes for resource management and protection. While these alternatives may provide the means to achieve instream flow management objectives, the Forest Service will maintain its discretionary authority to condition special-use permits with bypass flow requirements if such alternative strategies are unsuccessful in achieving needed instream flows for NFS lands. The strategies and suggestions contained in this report reflect a consensus of the parties involved and these parties are credited with considerable compromise to achieve this consensus. However, stakeholders do not waive their rights to challenge Forest Service actions.

Pathfinder Project Steering Committee

Since the May 2000 meeting, representatives from ten stakeholder groups, representing water users, conservationists, water regulatory and management agencies have met on a regular basis to provide local community perspectives, ideas, and possible ways to manage for instream flows on NFS lands. The Steering Committee members represent a diverse mix of stakeholders, including:

Club 20	Trout Unlimited
Grand Mesa and Grand Valley Water Users	San Miguel Watershed Coalition
Overland Reservoir and Ditch Company	State of Colorado Division of Water Resources
High Country Citizens’ Alliance	State of Colorado Division of Wildlife
Local Ranchers	State of Colorado Water Conservation Board
	U.S. Forest Service

¹ Organic Administration Act of 1897; Multiple-Use Sustained-Yield Act of 1960; the Federal Land Policy and Management Act of 1976; and, the Wild and Scenic Rivers Act of 1968.

Mission Statement

The Mission of the Pathfinder Steering Committee is: *to assist the Forest Service in providing appropriate instream flow protection on the GMUG National Forests.*

Background of Instream Flow Protection

Instream flow is the term generally referring to surface water that remains in the natural channel of a stream. In Colorado, as in most western states, surface water flowing in a stream is available to anyone who can make beneficial use of the water. Historically, that has meant that water is diverted via a constructed ditch or pipeline from the natural stream channel to agricultural lands or other locations where the water can be put to use for the purposes of growing crops, manufacturing products, or supplying water for human or animal consumption. The original purpose of Colorado water law was to adjudicate and administer the process of diverting water from the streams and protect the water put to beneficial use.

As Colorado has grown, in terms of development and population, demand for water has increased and diversion of water has resulted in diminished instream flows. Historically, Colorado water law did not have provisions to protect instream flows because in-situ use of water to maintain stream flows did not meet the traditional definition of beneficial use. Today, under Colorado State Law, the Colorado Water Conservation Board (CWCB) has the exclusive authority to acquire and appropriate water, water rights, and interests in water to protect instream flows. The CWCB Instream Flow and Natural Lake Level Program (ISF Program) under statutory authority² can appropriate minimum stream flows to preserve the natural environment to a reasonable degree. The ISF Program can also acquire existing water rights for subsequent conversion to instream flow rights for the preservation and improvement of the natural environment. Although the State Program includes natural lake level protection the focus of the Steering Committee is on instream flow protection.

Issues and Concerns

Two major issues and concerns surfaced in early meetings of the Steering Committee. They involved bypass flows and the use of the Colorado Instream Flow (ISF) Program.

The Forest Service may require bypass flows as a condition of special use permits on National Forest System lands. It should be noted that requiring bypass flows as a condition of special-use permit renewals is much more controversial than conditions placed on new permits.

In Colorado, requirements for bypass flows, as well as the failure to impose bypass flows, as part of a special-use permit renewal have been subject to litigation. Much of the

² §37-92-102(3) C.R.S.

controversy involving bypass flow authority and preservation of water rights has not been fully resolved and therefore continues to be an issue of great interest for water users as well as other parties interested in water resource use and protection.

The Colorado state agencies were concerned that the Forest Service had not been an active participant in the CWCB ISF Program. They and some of the other stakeholders believed the ISF Program could provide needed instream flow protection, but has not been part of the Forest Service water-management strategy. For a variety of reasons, other stakeholders were less convinced of the effectiveness of the State's program to meet the full range of resource management and protection needs on National Forest System lands.

A third concern related to federal adherence to state water law and recognition of privately held water rights surfaced after the initial Steering Committee meetings. Some stakeholders felt that state water law could also be a hindrance in providing instream flow protection on National Forests and believed that the Forest Service could not adequately carry out its resource management mandates without some authority over the waters on National Forest System lands. However, all stakeholders generally recognized the necessity to respect existing water rights.

Public Meetings

The Steering Committee recognized that, while bypass flows, ISF Program participation, and recognition of existing water rights were important issues, there is a need to obtain more insight into issues and concerns held by the public with regard to water use, water management and instream flow protection on NFS lands. Accordingly, the Steering Committee decided to develop a public involvement program component to help further identify water use issues and concerns. The Steering Committee utilized the services of the Colorado State University Extension Service to develop and manage the public outreach activities. Radio and newspaper public service announcements were used to notify the public of pending public meetings. A Pathfinder Project website was developed (www.GMUGpathfinder.org) to provide public access to information on the project, notice of public meetings, as well as review maps and other instream flow related data.

Five public meetings were conducted in local communities adjacent to the GMUG National Forest in the spring of 2002. Prior to the public meetings, almost 1,000 questionnaires were mailed out to water users, special-use permit holders, and other interested parties notifying recipients of the meeting dates, locations and asking them to comment on water use issues, concerns, and water-related values on NFS lands. The public meetings were structured to provide information on the Steering Committee's objectives, the Forest Plan revision process, and to gather public input on the importance of instream flows on NFS lands and their concerns regarding instream flow protection strategies and procedures. The Pathfinder Project website also allowed the public to respond to the questionnaire via the Internet. Details of public meeting responses and

results of the questionnaires are contained in a report titled, *Summary of Outreach Activities and Public Input: Spring 2002*.

In general the major issues, objectives, and values identified during the public-involvement process were:

- Any assertion of bypass flows as a legitimate administrative tool was highly contentious
- Bypass flows constituted a “takings” of private property
- Bypass flows created by Forest Service permitting are not protected water rights under the State’s statutes
- Water developments (reservoirs) sometimes provide instream flows that are not adequately recognized
- Beneficial effects of return flows are not adequately recognized
- First priority should be to protect existing beneficial uses (existing water rights) rather than environmental uses
- Economic trade-offs (costs of instream flow protection to water users) must be considered prior to any instream flow management action
- Compensation should be made to water right holders if bypass flows are required
- Maintain multiple-use doctrines for NFS lands
- Encourage greater cooperation among state, federal and local agencies
- Aesthetics of instream flows are important
- Water quality is an important component of water management
- Wildlife, fish, and riparian areas are important values related to instream flows
- Instream flows are important for recreational uses – rafting and fishing
- Industrial and domestic water uses should be a priority

After reviewing and evaluating the public comments and input as well as continued feedback from their stakeholder groups, the Steering Committee categorized the issues and concerns into seven-major components to be addressed. They are:

- Absolute water rights
- Conditional water rights
- Water development
- Ecological values
- Fish and aquatic species habitat
- Unique or high-use recreational values
- Flow-dependent water quality

Flow-dependent Values

Resources or stream uses that are directly linked to surface water flow (flow-dependent values) were identified for GMUG National Forests using mapped information (geo-spatial data bases) derived from existing water use and resource information available from the state and the Forest Service. Absolute and conditional water rights associated

with stream diversions as well as existing instream flow water rights held by the Colorado Water Conservation Board (CWCB) were identified along with other flow-dependent natural resource components such as:

- Aquatic species of concern (includes threatened and endangered species)
- Unique or high-use recreational attractions (e.g., waterfalls)
- Water quality (flow-dependent parameters)
- Fish and amphibian habitats
- Riparian vegetation
- Wildlife water
- Grazing water
- Groundwater recharge
- Wetlands
- Native and sport-fish populations
- Dispersed and developed recreation use along streams
- Aesthetics of flowing water
- Stream channel dynamics (sediment movement, gravel deposition, bank-full discharge)

Evaluation of these data showed that many of the flow-dependent resource values were widespread throughout the GMUG National Forest streams and could not be depicted on maps as specific site locations. These values, because they were common and widespread across a majority of forest streams, represent “baseline” resources on the GMUG National Forests.

From information contained in the Forest Service database, the GMUG National Forest can be delineated into several watershed levels. These levels are based on size and position within the river basin and are referred to as HUCs³. The smallest watershed level (7th level HUC) would generally have less than 10,000 acres. The next larger watershed level is the 6th level HUC watershed that generally ranges in size from 10,000 to 90,000 acres. There are approximately 223 delineated 6th level HUC watersheds where there are NFS lands within the watershed. Delineations of smaller level HUC watersheds are possible for most of the 6th level HUC watersheds; however, mapping of those 7th level HUC watersheds almost triples the number of watersheds where there are NFS lands within the watershed.

Water diversions and water storage facilities on NFS lands are present on two-thirds of the 6th level HUC watersheds. Water is diverted or stored for agriculture, municipal, domestic, and industrial supply. Water is consumed on NFS lands by livestock and wildlife; it provides groundwater recharge, supports vegetative (grasses, shrubs and timber) growth, sustains wetlands and riparian communities, creates aquatic species habitat, as well as provides for recreational use and aesthetic enjoyment. The NFS lands are managed for multiple-use and are open to the public as well as provide for authorized

³ HUC; Hydrologic Unit Classification, a system derived by the USGS to classify watersheds based on size and position within river basins.

private and commercial activities consistent with federal laws and regulations governing National Forests.

Because water diversions are linked to most of the instream flow issues and concerns, characterizing or sorting the streams on the NFS lands into major categories based on levels of diversion was completed to differentiate the streams on the GMUG National Forests. Watersheds were sorted into groupings based on the percentage of annual water yield (stream flow) being diverted (annual average) for out-of-channel use. The Steering Committee selected the following four levels of diversion to characterize streams on the GMUG National Forests:

- No recorded diversions (No Diversions)
- Water right diversions with no recorded volume of diversion or with less than 20 percent of the total calculated annual yield (0 to 20 % Diverted)
- Quantified water right diversions with a range of 20 to 50 percent of the total annual yield (20 to 50% Diverted)
- Quantified water right diversions with a percentage greater than 50 percent of the calculated annual yield (> 50% Diverted)

These four categories were further sorted as to whether the streams were inhabited by wildlife species of concern (which includes federally listed threatened and endangered species) or had potential populations of such species. One of the key species triggering this sort is the Colorado River Cutthroat trout because of the Forest Service's commitment to the multi-state, multi-agency *Conservation Agreement and Strategy for Colorado River Cutthroat Trout* (April 2001) that outlines a plan for sustaining that trout population in Colorado and other western states.

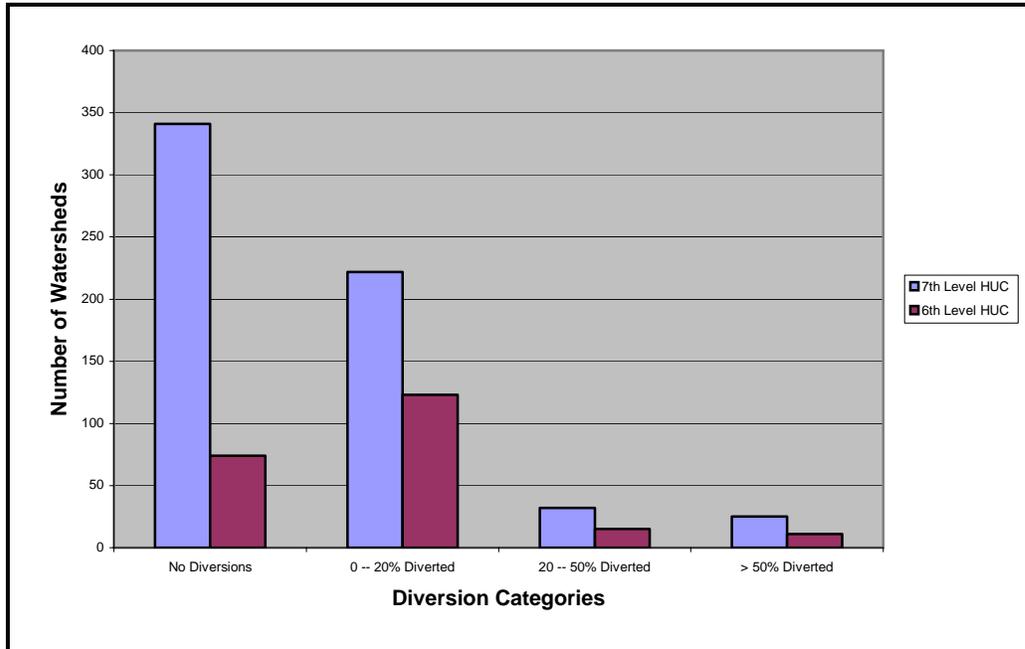
Table 1.1 Watersheds by Sorting Categories

	No Recorded Diversions		0 to 20% Diverted		20 to 50% Diverted		> than 50% Diverted	
	Species of Concern	No Species of Concern	Species of Concern	No Species of Concern	Species of Concern	No Species of Concern	Species of Concern	No Species of Concern
6 th Level HUC's	4	70	56	67	4	11	3	8
7 th Level HUC's	40	301	72	150	9	23	4	21
CWCB ISF Filings	18	46	29	51	5	8	3	3

The number of streams in any of these eight categories is subject to change over time (Table 1.1). This type of database is dynamic in that as new or updated information is acquired and as new diversions occur it could change the characterization of the watersheds based on presence or absence of species of concern or the amount of water diverted. It is important to note that as the size of the watershed increases (e.g., from 7th

level to 6th level) there are fewer watersheds without diversions. However, the majority of watersheds still continue to fall under the No Recorded Diversions and 0 to 20 % Diverted categories (Table 1.2).

Figure 1.2 Distribution of Watersheds by Diversion Categories



The primary purpose of the sorting characterizations was to provide a basis for defining goals and objectives for instream flow protection as well as to give perspective on the relative proportional relationship regarding the number of streams in each of the sorting categories.

Instream Flow Protection Goals, Objectives and Implementation

Tools

The Steering Committee compiled a list of strategies or actions that could be utilized to provide for or protect instream flows. These were characterized as “tools” that generally exist within the framework of federal and state statutes, regulations, laws and policies that, when utilized, can provide for instream flow protection or enhancement (Table 1.3). It is important to note that the numerical listing does not prioritize or assess the effectiveness of these tools. The list is categorized by three major headings: those options available under the auspices of the Forest Service, the State of Colorado, and those activities requiring cooperative or collective action by multiple parties to be effective. Some of the tools provide for direct instream flow protection, while others are more indirect with regard to their outcomes, but when they are a part of a larger strategy they can collectively achieve instream flow protection. The application of the tools relies on a tiered approach and is addressed in more detail in a following section titled, “Implementation of Instream Flow Protection Strategies” and in “Appendix B: Interpretation of Tools”.

Insert Table 1.3

Goals and Objectives

Using the stream sorting characterizations referenced above, the Steering Committee developed Goals and Objectives for instream flow management for each of the four stream classification categories. The outcome of this exercise is depicted in matrix format in Table 1.4. The goals define a direction or theme for each of the four stream categories and the objectives focus on a specific emphasis relative to several of the key issues (see Issues and Concerns referenced above). The goals change focus or have different visions for the different stream classification categories. The level of existing stream diversion has an influence on the goals and objectives for each classification category, as does the presence or absence of species of concern.

The Objectives provide more specific direction for different uses or resource values. The Objectives address specific values such as existing and conditional water rights, ecological values, fish/amphibian habitats, unique or high-use recreational areas, stream restoration, species recovery, and specific water quality concerns. Inherent in all the Objectives is the need to address both the unique values or key issues and those common or widespread values that provide a baseline of flow-dependent resources prevalent throughout the forests. These “baseline” values include, but are not limited to:

- Riparian vegetation
- Wildlife water
- Grazing water
- Groundwater recharge
- Wetlands
- Native and sport-fish habitats
- Dispersed and developed recreation use along streams
- Aesthetics of flowing water
- Natural hydrologic functions associated with stream flow

The more unique resource values and the amount of current water diversions most often were linked to identified instream flow issues or concerns. Therefore, the goals and objectives are directly tied to these values and issues rather than focused on the broader and more common baseline-values that occur throughout the forests. There is a general pattern or vision for the different stream classification categories. The Steering Committee looked at the no-diversion category of streams as a logical category to focus on preservation, because these streams offer the greatest potential for instream resource management with the least potential for conflict with existing water uses. For the two diversion categories in the middle of the matrix, where diversions constitute less than 50 percent of stream flow, the vision is to recognize existing and future water uses and the instream-flow needs in a balanced fashion consistent with multiple-use objectives. In the last category of the matrix, where diversions exceed 50 percent of stream flow, the vision recognizes existing water use but also the possible need to implement more active management strategies to restore instream flows.

Insert Table 1.4 Instream Flow Management Matrix

Implementation of Instream Flow Protection Strategies

The Steering Committee recognized the importance and need to apply the tools to the Goals and Objectives in order to implement the Steering Committee's instream-flow management plan. The application of tools is intended to achieve the Objectives and ultimately reach the Goals identified for the different stream categories.

The anticipated geographic scope of a prospective project will dictate the geographic level at which the tools will be applied. The implementation strategies must be tied back to the scope of the planning effort, whether at the strategic or project level evaluation. The Steering Committee's instream flow management matrix (Table 1.4) is essentially strategic level planning, but the Steering Committee recognizes that some projects on the National Forests will have limited effects and only localized impacts. Many projects may not have impacts on the overall function or integrity of the entire watershed. Accordingly, the appropriate application of the specific tools will generally be limited to the smaller or local watershed level. If the consequences or the scope of the project or plan being evaluated has the potential to affect the function or integrity of the entire watershed, then the application of the Goals, Objectives, and Tools should be at the larger scale and focus on impacted baseline values in the entire watershed.

Plans for new water diversions should primarily be evaluated under the existing stream category (e.g., 0-20% Diverted) not the stream category (sort level) of post-project conditions. However, in the event the approval of a new water diversion project would result in a change from one stream category to another, tools recommended for both of the sorting categories (the current and the post-project category) should be considered as part of a cumulative effects analysis that is required during the Federal decision-making process required by the National Environmental Protection Act.

The Steering Committee adopted a tiered approach for implementation or application of tools. The management matrix (Table 1.4) identifies tools (Table 1.3) for each objective by "Tiers." The "Tiers" define the recommended order of implementation. All of the Tier I tools are a first level of action designed to meet instream flow needs on the GMUG National Forests. Tier II constitutes a second level of recommended actions or strategies. The intent of these first two tiers is to recognize the most cooperative and constructive strategies that would integrate Forest Service actions and non-Forest Service programs related to instream flows into a management scheme that would ultimately provide the needed instream flows without requiring bypass flows on special-use permits.

The Steering Committee defines the application of bypass flow conditions for a special-use permit renewal as an action of "last resort". This last course of federal action would only occur when and if the applicable tools in the first two tiers have been exhausted and determined not to meet Forest instream flow needs. The parties supporting this strategy have not waived their rights and abilities to challenge such action. Prior to requiring bypass flows, the Forest Service would involve the CWCB, Colorado Division of Wildlife, State Engineer's Office and other interested parties in a review of the process to ascertain that all the other options to meet instream flow needs have been exhausted.

The Steering Committee recognizes that imposing or the failure to impose bypass flows will likely result in disputes and challenges which are inconsistent with the spirit of the process outlined by the instream flow management matrix and its suggested application of Tier I and II tools. Condemnation (eminent domain) is another use of the federal government’s powers. The Forest Service can unilaterally acquire private property for public purposes using its powers of eminent domain. Use of condemnation to acquire water for instream flows is extremely contentious as it necessarily reflects a prior failure to negotiate a purchase of property on a willing seller basis. Nevertheless, it is an authority available to the Forest Service for the acquisition of water rights.

The Forest Service has the authority to take numerous actions with regard to managing natural resources, including water, on NFS lands. The two most direct and controversial Forest Service actions are listed in Table 1.5 and should be considered actions of last resort. Additionally, the Forest Service has the discretion to deny a special-use permit application.

Table 1.5 Federal Unilateral Actions

Action	Application
Require by-pass flows as a condition of special-use permits for protecting and restoring natural resources and/or the aquatic environment.	Unilateral action by the Forest Service that requires water diversions on National Forest lands be reduced to provide for instream flows.
Use condemnation to acquire water for instream flows.	Forest Service acquisition of property rights for the benefit of the public if administrative options or willing seller have failed to provide water for instream flow purposes.

Public Review and Support

In a final effort to connect with stakeholders and the public on issues and concerns regarding the proposed instream flow management plan, the Steering Committee conducted a review process that involved presentations to various water management groups at seven public meetings. Steering Committee members were responsible for conducting the Pathfinder Project presentations at the different meetings where the audience was comprised of members from the larger constituency groups represented by the Steering Committee members. These meetings were open to the public but were either specially noticed meetings of a water management organization (e.g., Upper Gunnison River Water Conservancy District) or a noticed agenda topic at a regularly scheduled board meeting of a water organization or agency such as the CWCB and the Colorado River Water Conservation District. Comments and suggested revisions obtained from these outreach meetings provided important feedback and helped to formulate this report.

Further, the Steering Committee's work is consistent with portions of the recent Discretionary Review Decision (March 21, 2003) by Deputy Under Secretary of the Department of Agriculture, David P. Tenny, on Water Resources Management and Special Use Authorizations (www.GMUGpathfinder.org/Tennymemo) that states that "water uses on National Forest System lands should be managed through cooperation with states, other federal agencies, Tribal governments, holders of valid water rights and the interested public, rather than through unilateral regulatory action by the Forest Service."

Steering Committee Conclusions

The Tools, Values, Goals and Objectives, and Implementation Strategies sections and the associated tables in this report provide the rationale, process, and intent of the Steering Committee's Pathfinder Project instream flow management strategies.

The Pathfinder Project Steering Committee seeks to have the Forest Service carefully consider and evaluate the committee's proposed goals, objectives, and strategies to provide instream flow protection on NFS lands and that the concept of tiered application of management actions or strategies (tools) be integral in any Forest Service plan for managing water uses on the GMUG National Forests. The Steering Committee's assessment of goals and objectives for instream flow protection provides the Forest Service with a framework for its Forest Plan revision that seeks to achieve resource protection and provide for multiple-use and protection of water resources on NFS lands based on the issues and concerns expressed by stakeholders and the general public. The implementation strategies favoring cooperation and coordination are integral to the Steering Committee's vision for instream flow protection and constitute the heart of what the Committee feels is necessary to successfully accomplish the goals and objectives.

The Pathfinder Project Steering Committee recognizes that ultimately the Forest Plan will define the implementation procedures for these tools or other strategies to meet GMUG National Forest instream flow needs, but the Pathfinder Project goals, objectives, and strategies provide the Forest Service with a reasonable management approach for instream flow protection that should be considered in the Forest Plan revision.

Appendix A --- Glossary or Definition of Terms Used

Accommodate – Work together with water users and project proponents to process new water development permits under the auspices of the Forest Plan. (see Entertain)

Achieve – To accomplish through management or direct actions by the Forest Service.

Appropriate – A level of compliance that meets the prescribed needs through cooperative and cost-effective methods.

Baseline Value – A component of the forest natural resources that are flow dependent and are wide-spread and relatively common throughout the GMUG National Forests, (e.g., willows, cottonwoods, trout, fishing, groundwater recharge, wildlife and stock watering).

Bypass flow – An administratively required condition of use related to Forest Service issued water-related, special-use permits where a volume of water decreed to the user is required to remain in the stream, by-passing the point of diversion. It may also apply to reservoir operations where specific releases of water are required to provide for downstream flow.

Ecosystem – The community of plants and animals and their interrelated physical environment. Generally, the focus is on larger landscape units such as a mountain range, a river basin, or an entire watershed.

Ecosystem integrity – The complex interactions and interrelationships of the components of a healthy or properly functioning ecosystem.

Entertain – Receive and process new water development permit applications that comply with all other aspects of the Forest Plan and provide protection of species of concern populations and habitats.

Flow-dependent – A resource or use that is directly linked to surface water flow as part of its lifecycle or as a component of its overall viability.

Flow regimes – The cumulative effect of a stream's hydrograph where there is variation in flow volumes, typically related to specific seasons of each year.

Flow related – An action or activity that involves some aspect of surface water flow, either in volume or timing.

HUC – Hydrologic Unit Classification. River basins are delineated based on the their composite of smaller watersheds forming the larger basin. The ordering or sequence of numbering, based on this USGS-derived system, is that the larger the

watershed basin, the lower the number. First level HUCs are the major river basins in the United States, such as the Colorado, Mississippi, or Columbia, ranging downward in size to the larger numeric levels. The Gunnison River basin and the Upper Colorado River basin are characterized as 2nd level HUCs. The 7th, 6th and 5th level HUCs were evaluated in this planning effort and data were sorted and quantified to the 7th level watershed. A 7th level HUC would generally have a watershed area of less than 10,000 acres.

Not precluded – Not eliminating or ignoring those factors or values in the process of developing other uses.

Preserve – To keep in its current or existing condition, not provide for change.

Protect – To ensure the continued existence of an existing value or use.

Recognize – To formally state the presence of an act, law, regulation, right or statute.

Restoration – The act of returning a system or hydrologic regime to some level or semblance of a former condition, not necessarily in the exact form or condition, but to a functional state with similar or like attributes.

Seek – To pursue through legal or management actions a desired outcome or result.

Self-sustaining – Pertaining to natural resource functions or populations that are able to reproduce or perpetuate themselves naturally and without human assistance or intervention.

Scrutinize – Review and evaluate new water development permit applications with respect to overall instream flow needs for the watershed and only entertain those new applications where baseline recreational and ecological values are not unacceptably impaired.

Species of concern – Those plant or animal species, whose habitat have a flow related component and that because of limited populations or declining habitat, have become reduced in number or are no longer able to sustain themselves naturally in the environments where they traditionally have been found and therefore have received special recognition and management emphasis by federal or state agencies. These species include federally listed threatened and endangered species that have flow-dependant habitats.

Unacceptable impairment – A degradation of a value to the point that it is not functioning.

Unique attraction – A feature or attribute of the natural environment that tends to have higher than average visitor use or is special to the region. Limited availability, one of a kind.

Watershed – Those lands that comprise a continuous hydrologic unit that drain into a specific stream. The hydrologic unit contains upslope land areas that all drain toward only one stream.

Yield – The volume of surface water, that is generated by a watershed and generally measured on an annual basis.

Appendix B: Interpretation of Pathfinder Project Tools

Table 1.3 of the Pathfinder Project Report contains actions or strategies (“tools”) that could be used to provide for or protect instream values/benefits on NFS lands in the GMUG. These tools cover a broad array of actions, some are actions that are generally undertaken by the Forest Service through its resource management responsibilities, others are cooperative or partnership approaches to instream flow management and others require use or adherence to State instream flow procedures under the Colorado Water Conservation Board’s Instream Flow (ISF) Program.

The Pathfinder Project Steering Committee developed this list of tools to address an array of situations and management options. The numbering of the tools in no way reflects an order or sequence of application, the Pathfinder instream flow management matrix attempts to provide a basic order of application or implementation through the use of tiers with tools categorized in either Tier I or II as a preferred order of implementation. The following discussion attempts to document the details related to each of the tools and the intent(s) in applying them.

Forest Service Management Options

1. Inventory and consult with permittee on water rights, water uses, and permits.

Issue:	Intention in applying the tool:
<p>The Forest Service does not always have a complete inventory of existing water rights, water uses, and other water related permits when evaluating instream flow needs relative to evaluating special use permit renewals. There appeared to be a lack of coordination between State water management agencies, the Forest Service and water users on determining existing water rights and water uses on National Forest System (NFS) lands.</p>	<p>The Forest Service would complete and maintain an up-to-date inventory of water rights acquired and held by the United States for NFS lands as well as those valid and existing water rights recognized by the Colorado State Engineer that have a point of diversion on or are conveyed across NFS lands. The Forest Service would consult with special use permittees on water use and water needs as part of its water rights and water use inventories and assessments prior to making determinations on instream flow needs as they relate to water-related, special-use permits.</p>

2. Negotiate permit conditions for instream flow purposes on new water development.

Issue:	Intention in applying the tool:
The Forest Service can unilaterally impose conditions for maintaining instream flows when a new special-use permit is issued for a water diversion or storage project on NFS lands.	The Forest Service would negotiate and work in coordinated fashion with water users and water regulatory and management organizations to address instream flow needs on NFS lands and ultimately include permit conditions that are mutually agreed upon.

3. As a permit condition, limit diversions to decreed amounts when needed, seasonally.

Issue:	Intention in applying the tool:
Under Colorado water law, if there is more water than the decreed amount of the diversionary right and it can be put to beneficial use, it can be legally diverted.	The Forest Service would condition a special-use permit, whether new or when renewed, to limit water diversions to the water user's decreed water right.

4. Implement channel and fish habitat improvements to compensate for lower flows when a determination has been made that such improvements have biological merit.

Issue:	Intention in applying the tool:
Opportunities to develop in-channel improvements for fish habitat were not always considered when trying to mitigate reduced instream flows, resulting from current or prospective projects.	The Forest Service would fully investigate the potential for restoration or habitat improvements that may provide equivalent biological benefit at specific flow regimes.

5. Consider other forest practices that influence stream flows, such as vegetation management.

Issue:	Intention in applying the tool:
<p>The Forest Service has been reluctant to consider other practices such as vegetation manipulation to increase water yield.</p>	<p>The Forest Service would consider watershed management techniques in its management plans to increase water yield in watersheds where additional instream flow is needed to meet Forest Service objectives.</p>

6. Use land and water acquisition programs and water right purchases to obtain water rights or interests in water that could be converted to instream flow (ISF) rights.

Issue:	Intention in applying the tool:
<p>There are funding mechanisms and programs to acquire existing water rights that could be used to meet Forest Service needs for instream flows, including interruptible-supply arrangements (e.g., drought year leasing).</p>	<p>The Forest Service could, directly or indirectly, acquire water for instream flows for subsequent inclusion into the CWCB Instream Flow Program. This would be on a willing seller basis or could be part of a larger land acquisition action.</p>

7. Ensure that water rights acquired as part of an USFS acquisition or exchange are incorporated into the Forest’s water right inventory.

Issue:	Intention in applying the tool:
<p>Concern that the Forest Service had acquired water rights as part of its land acquisition program and those water rights were not part of the its water resource management program.</p>	<p>Provide for coordinated management of water resources within the Forest Service between the lands program and the water resources/aquatics program.</p>

8. Protect water rights held by USFS.

Issue:	Intention in applying the tool:
<p>Concern that the Forest Service was not maintaining and/or documenting beneficial use of water rights filed by the United States on NFS lands.</p>	<p>Ensure the Forest Service does not allow existing water rights to lapse into non-use so that those water rights do not become unavailable for future use, change in use, or transfer.</p>

9. Expand USFS efforts to inventory and assess the aquatic and riparian resources on GMUG NF.

Issue:	Intention in applying the tool:
<p>The Forest Service has not completed aquatic and riparian assessments Forest-wide. Completion of such assessments would aid in the prioritization of streams and focusing instream flow protection efforts.</p>	<p>The Forest Service should conduct needed field evaluations of aquatic resources and riparian areas to better apply scientific data as part of the instream flow protection strategies.</p>

10. Practice good watershed and streamside management to deliver sufficient quantity and quality water to meet downstream and forest uses.

Issue:	Intention in applying the tool:
<p>Concern that Forest Service programs or approved activities on NFS lands could have inadequate water resource protection thereby causing poor quality runoff or reducing water yield.</p>	<p>Make sure that water resource protection and water management objectives are considered and incorporated into all activities occurring on NFS lands. Emphasize the importance of erosion control and the value of maintaining healthy forest conditions on NFS lands.</p>

Cooperative or Partnership Approach Options

11. Assist Colorado Water Conservation Board (CWCB) and the State Engineer in monitoring and protecting existing ISF rights on GMUG National Forests.

Issue:	Intention in applying the tool:
<p>When the Forest Service evaluates water diversion or storage applications for special-use permits it may not be consulting with the State Engineers Office or CWCB to see if such an approval would impact an existing ISF water right.</p>	<p>Administration and enforcement of water rights is the authority of the State Engineer’s Office and the CWCB has the authority in Colorado to hold instream flow water rights. Therefore, the Forest Service would coordinate with those agencies when new special-use permits are being evaluated and assist in monitoring stream flows.</p>

12. Work with CWCB to recognize the National Forest land and resource management objectives and quantification methods for streams on the Forest may differ from the objectives and methods CWCB currently provides.

Issue:	Intention in applying the tool:
<p>The CWCB ISF Program establishes instream flows to maintain baseflow conditions to protect the environment to a reasonable degree. There may be situations where those ISF flow volumes and/or timing of flows may not adequately meet the Forest Service’s broader resource management requirements and needs.</p>	<p>The Forest Service, aided by other interested parties, would identify the instream flow needs for specific streams where the State’s ISF Program objectives and quantification methods may not fully address federal instream flow needs. Where additional flow volumes and/or timing of flows are deemed necessary, more intensive field assessments and resource information needs to be completed and those recommendations forwarded to CWCB.</p>

13. Investigate voluntary re-operation alternatives with existing diversion permit holders to meet Forest Service and permittee objectives.

Issue:	Intention in applying the tool:
<p>Voluntary changes of existing water users’ diversion schedules or re-operating a reservoir may provide needed instream flow at critical periods or provide for additional instream flows. Such change could be accomplished through a proactive, joint problem-solving effort.</p>	<p>The Forest Service, the water users, and other interested parties, should work together to determine if, through mutual agreement, re-operations of existing facilities could provide instream flow benefits needed by the Forest Service on NFS lands. Such re-operation alternatives should be based on a demonstrated need for change and a jointly agreed upon problem resolution.</p>

14. Seek voluntary agreement with new applicants to develop operational plans to meet Forest Service and applicants' objectives.

Issue:	Intention in applying the tool:
<p>Conditioning a water related special-use permit with unilaterally imposed operating schedules may provide for instream flow needs, but does not provide for coordinated input from the water user or other interested parties.</p>	<p>The Forest Service should seek to develop water diversion or water release operational plans with the applicants in a coordinated fashion, using input from other interested and knowledgeable persons. The Forest Service would attempt to attain voluntary agreement from the water user on how best to operate the water facility to benefit or provide instream flows while still achieving the beneficial uses of the water facility.</p>

15. Consider new and expanded storage with participation by the Forest Service for instream flow purposes (which include the Forest Service appropriating or acquiring an interest in the water rights).

Issue:	Intention in applying the tool:
<p>Water storage and reservoir releases may optimize stream flows to meet Forest plan objectives.</p>	<p>The Forest Service should evaluate new and existing reservoir storage facilities to determine if additional storage could provide instream flow benefits on streams on NFS lands. If such benefits could be derived from such projects, the Forest Service could participate in the development of the facilities both in terms of acquiring water rights to be used for storage water and later release or as a partner in reservoir construction and operation.</p>

16. Consider off-channel storage for later release.

Issue:	Intention in applying the tool:
<p>Traditional water storage often places the reservoir on the main stem of the stream channel creating fish passage barriers and changes the hydrology down stream. Utilization of off-channel storage facilities avoids some of the changes to stream hydrology and does not create the barriers to fish passage that in-channel dams create.</p>	<p>The Forest Service would consider the use or development of off-channel storage to meet its instream flow needs.</p>

17. Provide State Engineer with documentation on water rights not being used.

Issue:	Intention in applying the tool:
<p>The Forest Service could be aware of water diversion facilities or reservoirs that have fallen into disrepair or non-use.</p>	<p>Administration and enforcement of water rights is the authority of the State Engineer's Office but if the Forest Service is aware of non-use of existing water rights or facilities it should, in a cooperative manner, make that information available to the State Engineer's Office.</p>

18. Initiate educational programs for water conservation and promote/facilitate delivery and application efficiencies.

Issue:	Intention in applying the tool:
<p>Because diversion facilities are often older structures built when there was less demand for water and overall water use was lower on many of the rivers and streams in the area, there was a lack of concern with conveyance losses, irrigation efficiency and water conservation. Inefficient irrigation practices have the potential to require greater diversion of stream flows than may be necessary.</p>	<p>Programs to educate and inform water users about conservation and the most current irrigation technology may encourage more efficient use of water. The Forest Service, in cooperation with other agencies and interest groups should help to encourage and implement strategies for more efficient delivery and application of irrigation water. More efficient use of water should result in reduced diversions and in turn benefit instream flows.</p>

19. Establish ISF management objectives for watersheds on the GMUG National Forests.

Issue:	Intention in applying the tool:
<p>With over 3750 miles of perennial streams on the GMUG lands, the Forest Service does not have a clear prioritization process for determining which streams need instream flow protection or where there is insufficient instream flow under current conditions to meet Forest Service needs.</p>	<p>The Forest Service should, in cooperation with other resource management agencies and interest groups, develop watershed priorities for instream flow evaluations. The Forest Service would develop criteria related to instream flow assessment methodology appropriate to meet its instream flow needs and should ultimately develop instream flow recommendations for those streams where protection is needed and remediation strategies for those streams where there is currently insufficient instream flow.</p>

20. Work cooperatively with local governments to establish Recreational In Channel Diversion (RICD) on appropriate stream segments located on NFS lands.

Issue:	Intention in applying the tool:
<p>The RICD water rights can only be held by local governmental entities but these may protect or enhance opportunities for recreational instream flow management on NFS lands.</p>	<p>The Forest Service should consider its recreational needs as well as evaluate the instream flow recreational potential of streams on NFS lands for possible use by local governments as a RICD facility. The Forest Service needs to work cooperatively with those local entities that may apply for a special-use permit to operate and manage a RICD facility on NFS lands since such use may meet public recreational demands as well as provide instream flow volumes that may benefit other natural resource values on NFS lands.</p>

Colorado Water Conservation Board Instream Flow Program Options

21. Pursue opportunities offered by CWCB ISF Program.

Issue:	Intention in applying the tool:
<p>The Forest Service has not participated either in making instream flow stream recommendations to the CWCB nor has it provided CWCB with technical information related to instream flow needs on NFS lands. Lack of Forest Service participation may be limiting the protection of instream flows on NFS lands.</p>	<p>The Forest Service would make recommendations to the CWCB for streams that need ISF Program protection based on determinations of instream flow needs on NFS lands. The Forest Service should assist the CWCB staff with technical information available on those streams recommended by the Forest Service.</p>

22. Seek CWCB agreement to appropriate or acquire needed flows on NFS lands.

Issue:	Intention in applying the tool:
<p>The CWCB ISF Program appropriates and acquires water to protect or improve the environment to a reasonable degree.</p>	<p>The Forest Service, in coordination with other stakeholders, should provide technical information and studies that should be utilized by the CWCB in determining the needed instream flows for streams on NFS lands.</p>

23. Encourage CWCB to file on USFS flow recommendations the year they are made.

Issue:	Intention in applying the tool:
<p>There was concern that instream flow recommendations may not be acted upon in a timely manner, thereby allowing other water users to precede the CWCB filing for instream flow water rights.</p>	<p>The Forest Service and other cooperating parties should request prompt action on instream flow recommendations for streams on NFS lands.</p>

24. Establish legal, shared property ownership with the CWCB for acquired ISF rights on NFS lands.

Issue:	Intention in applying the tool:
<p>One of the barriers to the CWCB and Forest Service working together on instream flow protection on NFS lands is the question of legal ownership of federal property. Property purchased by the federal government cannot be transferred to a non-federal entity, thereby limiting the Forest Service’s ability to convey acquired water rights to CWCB for instream flow water rights.</p>	<p>The Forest Service and CWCB would work to develop a Memorandum of Understanding (MOU) or some legally binding instrument so that the CWCB could manage water rights acquired by the Forest Service under the authorities of its ISF Program to provide instream flow protection on NFS lands.</p>

25. Encourage CWCB to file on peak spring flows and shoulder flows under the ISF Program to allow for recharge of groundwater and maintain riparian and off-channel habitat.

Issue:	Intention in applying the tool:
<p>The CWCB ISF Program bases instream flows primarily on a need to maintain baseflow conditions to protect the environment to a reasonable degree and there may be situations where those ISF flow volumes may not adequately meet the Forest Service’s broader resource management requirements and needs. Historically, the State’s ISF rates have only varied for summer and winter flow regimes in some situations, others only have one baseline flow amount for an entire year.</p>	<p>The Forest Service, in coordination with other stakeholders, would present technical information and studies that could be utilized by the CWCB in determining the need for multiple instream flow amounts based on historical variations in stream flow hydrographs in an effort to protect, components of the natural environment to a reasonable degree, such as alluvial groundwater recharge, riparian vegetation, and other alluvial or floodplain habitats that require periodic bank-full or out-of-bank flooding.</p>

26. Encourage the State Legislature to expand the CWCB ISF Program to include recreational, scenic, and aesthetic uses.

Issue:	Intention in applying the tool:
<p>The state's current ISF Program objectives do not recognize general recreational use, scenic and aesthetic values as beneficial uses attributed to instream flow water rights. Forest Service mandates include management of natural resources so as to minimize damage to scenic and aesthetic values</p>	<p>Interest groups and the CWCB would recommend to the State Legislature changes to the CWCB's ISF Program which recognize general recreational use, scenic and aesthetic values as beneficial uses associated with instream flow.</p>

27. Identify stream segments currently limited by availability of water for ISF protection and improvement.

Issue:	Intention in applying the tool:
<p>Some streams or segments of streams may not have sufficient unappropriated water to support a CWCB ISF water right for baseflow conditions. Additionally, some streams, due to natural conditions may have insufficient flow regimes to sustain some desired uses.</p>	<p>The Forest Service would obtain the CWCB inventory of streams where existing conditions preclude or severely restrict the volume of water that could be appropriated for instream flow purposes and utilize other tools to make water available for instream flows.</p>

Appendix C: Federal Unilateral Actions

Not included in the tools list are those existing federal authorities that are to be considered as actions of “last resort.” The Forest Service maintains these unilateral actions are within their sole discretionary authority. The Forest Service would deem these actions necessary in the event that other tools fail or are inadequate in meeting resource management objectives or mandates on NFS lands.

These authorities have been and continue to be the subject of protracted legal and political debate. The State of Colorado is obligated and committed to protect the adjudicated use of water rights in Colorado. Similarly, federal and environmental interests have advocated in favor of federal bypass flow authority. The Pathfinder strategies seek to provide alternative actions and methods that through cooperation and coordination can make the use of these unilateral actions unnecessary in order to protect instream flows.

The following are the two most direct and controversial Forest Service actions to manage water resources on NFS lands:

Require bypass flows as a condition of special-use permits for protecting and restoring natural resources and/or the aquatic environment.

Issue:	Suggestions related to this action:
<p>The contentious nature of bypass flow conditions on special-use permits, particularly renewals, makes the process used in implementing such restrictions a major issue with water users, water managers, special interest groups, and the State of Colorado. The timing, approach, and procedures used by the Forest Service regarding bypass flow requirements are of great interest to the water resource communities and the State of Colorado.</p>	<p>The use of special-use permit conditions that involuntarily restrict diversions should be taken only as a last resort in the process of providing for instream flows. Other actions or options first need to be explored and utilized that rely on cooperative and coordinated actions by the Forest Service, water users, water right holders, and other water management organizations to meet instream flow needs. This option should be considered only in the event that all other cooperative and administrative strategies to meet Forest Service instream flows have been fully exhausted.</p>

Use condemnation to acquire water rights for instream flows.

Issue:	Suggestions related to this action:
<p>Condemnation is a controversial issue and is a concern of many water users if it is used to provide instream flows on NFS lands.</p>	<p>At this point, the Forest Service would have exhausted its options to acquire water rights on a willing seller basis and conditions have been placed on the special-use permit for instream flow protection. The Steering Committee believes these actions may result in some form of legal intervention where the Forest Service is directed to acquire water rights for the benefit of the public under its powers of eminent domain. It is expected that such an action would be needed to provide just compensation to the owner(s) for the condemnation of water rights for instream flow purposes.</p>