Background

Christopher, Canyon and Haigler creeks are located east of the Town of Payson in Gila County, Arizona. The project sites are located entirely on lands managed by the Payson and Pleasant Valley Ranger Districts, Tonto National Forest (TNF). The Arizona Game and Fish Commission (Commission), through the Arizona Game and Fish Department (AGFD), has been coordinating efforts to enhance the existing aquatic habitat and riparian characteristics of Canyon, Christopher, and Haigler creeks. AGFD has conducted a series of aquatic habitat assessments documenting current conditions of the creeks within the project area. Stream morphology, geomorphic condition, and potential for aquatic habitat enhancement and restoration are addressed in these assessments, which include:

- *Natural Channel Design (NCD), Inc.* 2008a. *Canyon Creek Aquatic Habitat Assessment and Enhancement Design. Submitted to the Arizona Game and Fish Department.*
- *Natural Channel Design, Inc.* 2008b. *Canyon Creek Watershed/Aquatic Habitat Draft Assessment. Submitted to the Arizona Game and Fish Department.*
- *Natural Channel Design (NCD), Inc.* 2010c. *Christopher Creek Aquatic Habitat Assessment, Project #E0075803, Site Assessment Report, Submitted to the Arizona Game and Fish Department.*
- *Natural Channel Design, Inc.* 2010d. *Christopher Creek Aquatic Habitat Improvement Project #E0078277. Submitted to the Arizona Game and Fish Department.*
- *USFS Tonto National Forests.* 2010b. *Addition of gravel to Canyon Creek as part of the Mogollon Streams project*
Purpose and Need for Action

The purpose of this project is to enhance aquatic habitat in an approximately 5-mile segment of Canyon Creek, two segments of Haigler Creek totaling 3.5 miles, and two segments of Christopher Creek totaling approximately 1.5 miles. This action is needed because the habitat of these creeks has deteriorated in the past decade as a result of severe fires and flood events (NCD 2008a, NCD 2008b, and NCD 2010).

This action responds to the goals and objectives outlined in the 1985 TNF Plan and helps move the project area toward the desired conditions described in that plan. The project area is located in Management Areas 4D (Christopher Creek), 5G (Haigler Creek), and 5D (Canyon Creek). Areas 4D and 5D are intended to “manage for a variety of renewable resource outputs with primary emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity.” Area 5G is intended to “manage for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation.” The proposed action would be anticipated to improve habitat for wildlife, specifically aquatic habitat improvement.

Proposed Action

The action proposed by the AGFD, in cooperation with the TNF, to meet the Purpose and Need, consists of: 1) the construction of site-specific aquatic habitat enhancement structures within portions of Canyon Creek, Christopher Creek, and Haigler Creek; 2) replacement of jersey barriers in a portion of Canyon Creek; and 3) installation of spawning gravel in portions of Canyon Creek.

The project area would include the following sections of the creeks:

- Canyon Creek: aquatic enhancement structures will be placed in an approximately 5-mile reach located adjacent to and south of the TNF Canyon Creek campground and south of SR 260 (Figure 1). Figure 1 also indicated locations for placement of spawning gravel within Reaches 3 through 5 and location of the Jersey barrier replacement.
- Haigler Creek: approximately 3.5 miles of stream habitat within two reaches. The first reach begins approximately 1.0 mile upstream of Forest Road (FR) 200 road crossing at the Haigler Canyon Campground extending downstream approximately 0.5 miles below the road crossing. The second reach is approximately 0.75 mile length of stream located on TNF lands adjacent to the Alderwood Campground (Figure 2).
- Christopher Creek (two locations): 1) an approximately 1.5 mile reach of stream southwest of the private land-TNF boundary downstream of the Christopher Creek Campground; and 2) a 0.5 mile reach of stream at the intersection of the See Canyon Trailhead and Christopher Creek (Figure 3).

AGFD has identified the following improvements as part of the Proposed Action to address the Purpose and Need for this project: installation of spawning gravel, mini weirs, root wads, tree or rock barbs, cross-over and loose-crossed logs, boulder clusters, log overhangs, and brush revetments; excavation of pools; bank sloping; willow pole and seeding plantings along banks; and replacement of Jersey barriers. Heavy machinery will only be used in areas that are currently accessible to heavy equipment. In areas
that cannot accommodate heavy equipment access, the enhancements would be accomplished using hand tools. These structures could be installed in phases over a period of approximately 4 months to 4 years, depending on the availability of funds.

In addition to enhancement of fish habitat, some minor trail work may be included in the project design such as designation of paths, placement of steps and stream access points to remove braided trails and improve streamside vegetation establishment.

Detailed descriptions of locations, materials, and methods for enhancement feature construction are established in the NCD 2008 reports, USFS 2011b and USFS 2011c for Canyon Creek; and the NCD 2010 reports for Haigler and Christopher Creeks. In general, material for construction of enhancement features and replacement of Jersey barriers would include relocation of existing boulders and/or logs from within the active stream channel or within a 100-foot radius of the proposed feature when material is not available in the active channel. Some structures would require steel cable and anchors to keep them in place; however, the use of cable would be minimized and native materials would be utilized as much as possible. In areas without machine access, structures would be installed by hand crews, which would limit the size and types of materials utilized.

Spawning gravel installation will be conducted using wheelbarrows and/or 5-gallon buckets to haul the gravel to the sites. The gravel will be dumped into the stream with 5-gallon buckets and then distributed evenly using rakes. Jersey barriers will be replaced with large boulder clusters. Revegetation crews will back fill the area behind the boulder clusters and revegetate the area with deer grass and willow poles.

The TNF, Payson and Pleasant Valley District Rangers will decide whether to issue a Special Use Permit to AGFD for the construction of site-specific aquatic enhancement structures within portions of Christopher, Haigler and Canyon creeks.

Affected Environment

Existing Conditions

The following information is taken primarily from the NCD 2008 and 2010 assessment reports and the TNF 2010 Jurisdictional Delineation assessment of the project areas. Detailed analyses of current conditions of vegetation, water quality, fisheries habitat, hydrology and geomorphology are available in these reports located in the project record.

Canyon Creek

The watershed of Canyon Creek lies immediately below the Mogollon Rim. It flows from the northwest to southeast across central Arizona. The entire watershed in and above the project area has been severely impacted by the Rodeo-Chediski Fire that took place in 2002. The fire killed many of the mature conifers on slopes draining to Canyon Creek. Watershed recovery in the burned area consists of grasses, shrubs, and, in places, dense thickets of New Mexico Locust. The fire also damaged or killed many mature cottonwoods and several Ponderosa pine trees near the stream. Currently there is evidence of regeneration of cottonwood and willow saplings along the stream corridor.

Surveys conducted by NCD and AGFD conclude stream temperatures warm rapidly through the project site. NCD data from the lower end of the project site indicate that optimum temperatures for Brown trout (22.2° C) were exceeded for several months in 2005 with a maximum temperature of 28° C. Temperatures in the mid portion of the project were cooler and...
only exceeded optimum temperatures for several weeks during July 2005. High flows through the project area are created by both snowmelt and summer monsoon events. Ground cover in the watershed is recovering from the effects of the Rodeo Chediski fire and runoff patterns are probably at or near pre-fire condition. Results from NCD hydrology modeling methods provide reasonably consistent estimates for flood frequencies in Canyon Creek and indicate that the watershed above the project reach can produce significant flood volumes during infrequent flood events.

The NCD report found recovery of fish populations (both native and non-native) since the fire has been uneven and has been affected by water temperature, pool and riffle habitat distribution and availability of spawning habitat. Pebble counts indicate that the substrate has coarsened as the stream recovers from the effects of the fire (NCD 2008a).

**Haigler Creek**

Haigler Creek is a perennial tributary of Tonto Creek. The headwaters are located along the Mogollon and Naegelin Rims east of Payson, AZ. Two National Forest campgrounds are located along the stream providing access and accommodations for TNF visitors. There are several tracks of private land along the stream with limited public access between the two Forest Service campgrounds. The uplands surrounding Haigler Creek are dominated by ponderosa pine forest and associated plant communities. The riparian zone consists mainly of tree species with alder (Alnus oblongifolia) or Arizona Sycamore (Platanus wrightii) being the most abundant. Cottonwoods are found mainly in the downstream reach near the Alderwood Campground. Sandbar willow (Salix exigua) is present in open areas but does not dominate the mostly shaded stream banks. Dense tree canopy prevents development of understory shrubs.

There has been a moderate size wildfire along the Naegelin Rim in the headwaters of Haigler Creek in recent years. Water quality and runoff have not been severely impacted by this fire. There are no known water quality issues with Haigler Creek. Water quality parameters appear to be within the tolerances for survival, growth, and reproduction of trout species. However, a portion of the stream below Alderwood campground has recently experienced a large flood which has rerouted the stream in several places. Large downed trees appear to have clogged the channel during flooding and diverted flows across the flood plain. In addition, this reach has high pedestrian traffic areas along the banks from recreational users as well as signs of livestock grazing. Results from NCD hydrology modeling methods provide reasonably consistent estimates for flood frequencies in Haigler Creek and indicate that the watershed above the project reach can produce significant flood volumes during infrequent flood events.

**Christopher Creek**

Christopher Creek is a perennial tributary of Tonto Creek. The TNF manages the majority of land surrounding the stream. However there are significant private holdings around the Village of Christopher Creek and downstream of the TNF Christopher Creek campground. The project area includes a upstream reach which is a relatively short portion upstream of the village of Christopher Creek at the See Canyon trailhead and the downstream reach is a 1.3-mile section of Christopher Creek centered on Christopher Creek Campground and extends through the TNF to private lands occupied by the R-C Boy Scout Ranch. The second reach extends through the TNF’s Christopher Creek Campground which provides an access point to the stream for
recreational fishermen. A low-water crossing and user created trails within the campground provide easy access to the stream.

In the fall of 1970 the Mogollon Rim experienced a high intensity rainstorm that caused major flooding within the project area. Area streams were extremely eroded and suffered extensive woody debris buildup. Portions of many channels were eroded to bedrock. The TNF undertook a large-scale channel and debris clearing effort coupled with some fish habitat improvements. While the rim streams have generally recovered to stable channel forms and vegetation, the effects of the channel downcutting and clearing can be seen in the present day morphology. The previously constructed fish habitat improvements are no longer intact. Water quality parameters appear to be within the tolerances for survival growth and reproduction of trout species. However, Christopher Creek is rated as not attaining for E. coli and impaired for phosphorous (Arizona Department of Environmental Quality 2006). A total maximum daily load (TMDL) analysis was completed in 2004 that is implementing measures to bring E.Coli into compliance with standards. Phosphorous levels are expected to decline when measures to reduce E.Coli are implemented. The source of E.Coli problems were identified as septic and waste disposal systems. Locations for bacteria problems were identified above, within, and below the lower reach identified for aquatic habitat improvement. One short reach upstream of the Hunter Creek confluence exhibited high densities of filamentous algae during May 2009.

The TNF, through the AGFD third party contractor, conducted an on-site jurisdictional delineation for the presence of Waters of the United States within the project areas on May 11, 2010 and June 22, 2010. The jurisdictional limits along Christopher, Haigler, and Canyon creeks were determined and adjacent wetlands were identified along the banks by assessing the presence of hydrophytic vegetation and wetland hydrology. Aerial maps showing the proposed delineation and fringe wetlands for each of the creeks were produced. Based on information collected during the field reconnaissance (i.e., physical characteristics) and drainage information relevant to the project area, the TNF recommended that these portions of Christopher, Haigler, and Canyon creeks be considered Relatively Permanent Waters with adjacent wetlands. Flows within these portions of Christopher, Haigler, and Canyon creeks are perennial and support adjacent wetland vegetation. Jurisdictional Determination Forms and Wetland Determination Data Forms for each creek have been submitted to the US Army Corps of Engineers. See the USFS Tonto National Forests. 2011. Section 404 Jurisdictional Delineation: Aquatic Habitat Restoration of Christopher, Haigler and Canyon Creeks (USACE File No.: Not assigned) located in the project record.

Relevant laws, regulations and policy

The Proposed Action is consistent with the TNF Forest Plan (USFS 1985, as amended [the Forest Plan]), USFS policy and other management considerations. The project was designed in conformance with the Forest Plan and other federal and state law, policy, and direction applicable to the resources present in the TNF. The National Forest Management Act of 1976 (Public Law 104-33, as amended) requires the USFS to provide for biological diversity on NFS lands consistent with overall multiple-use objectives and to maintain viable wildlife populations in the planning area. The Forest Plan discloses standards, guidelines and management area (MA) direction across the TNF.

The TNF has discretion to accept or reject the Proposed Action, and as part of its decision process, the TNF must comply with the National Environmental Policy Act (NEPA), the National Forest Management Act, USFS Special Use Permit regulations in CFR Title 36: Part 251, and other applicable statutes, regulations, executive orders, and USFS Manual and Handbook direction (collectively, “the applicable legal requirements”). The TNF needs to evaluate the request from the AGFD for the use of NFS lands and
to manage those lands to protect the natural resources, administer use, and ensure public health and safety. Some of the pertinent direction on standards and guidelines for program components as described in the Forest Plan include the following:

F01: Minimize impacts on soil and water resources from all ground disturbing activities. (p44)

C01, E00 Riparian Areas: Emphasize maintenance and restoration of healthy riparian ecosystems through conformance with forest plan riparian standards and guidelines. Management strategies should move degraded riparian vegetation toward good condition as soon as possible. Damage to riparian vegetation, stream banks, and channels should be prevented. (Replacement page 40-6)

C03 All Riparian Areas: Rehabilitate and maintain, through improved management practices, mixed broadleaf riparian to achieve 80% of the potential overstory crown coverage. Natural regeneration is anticipated to achieve most of this goal. Artificial regeneration may be necessary in some areas.

Re-establish riparian vegetation in severely degraded but potentially productive riparian areas. Natural regeneration is anticipated to achieve this goal, but artificial regeneration may be necessary in some areas. (p41)

Management Area 4D Christopher Creek Manage for a variety of renewable resource outputs with primary emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity (replacement page 127).

Management Area 5D Canyon Creek Manage for a variety of renewable resource outputs with primary emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity (replacement page 151).

Management Area 5G Haigler Creek Manage for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed so as to improve them to a satisfactory or better condition. Improve and manage the included riparian areas (as defined by FSM 2526) to benefit riparian dependent resources. (p 164)

This action responds to the goals and objectives outlined in the 1985 TNF Plan and helps move the project area toward desired conditions described in that plan.

The following conservation measures would be used to protect the soil and watershed resources within the project areas of the creeks and thus reduce construction related impacts to soil and watershed resources:

- When possible trees that have fallen naturally and are still suitable for use would be used instead of felling living trees;
- No trees greater than 18 inches diameter at breast height (dbh) would be felled (larger diameter down logs can be used);
- Tree removal would focus on trees that are suppressed or subordinate in growth form and/ or diseased, when possible;
- Only living trees would be felled;
• Slash would be lopped and scattered in such a manner so that no slash pile is over 3 feet high and is not in contact with living trees;
• Slash would be used to cover disturbed areas when possible; and
• Only trees that would be used for the project are allowed to be felled.
• No Douglas fir or riparian obligate trees would be felled.
• No trees would be felled from a goshawk post fledging area (PFA) or Mexican spotted owl protected activity center (PAC).
• A FS Biologist would assist in the identification of trees (living or downed) to be used within designated Critical Habitat for the Mexican spotted owl.
• No trees with a raptor nest that has been active in the past year would be felled.
• The active stream channel would not be crossed by heavy equipment.
• Soil raking, distributing slash from felled trees, and replacing ground litter would be used to return the terrain to a natural condition immediately after ground disturbing activities such as, but not limited to:
  o Heavy equipment use--trucks, trailers, tractors, back hoes, front end loaders, etc.;
  o Skid marks (drag marks) caused by dragging felled trees into place;
  o Divits caused by removing boulders from the uplands and moving into place; and
  o Any other ground disturbing activities associated with securing logs or boulders into place.
• Willow and cottonwood pole cuttings would be taken during the dormant season; after leaf fall and before bud burst.
• No more than two-thirds of the willow or cottonwood pole source tree would be harvested.
• Pole planting on freshly worked banks would be accompanied by seeding with a mix of local native grasses.
• Project related construction activities would only occur September 1st through November 30th. Restricting construction activities to the autumn would reduce or eliminate impacts to recreational users of the creek, nesting migratory birds, nesting goshawk and Mexican spotted owl, and other sensitive avian species.
• Construction of enhancement features within the active channel would not occur during high flows such as during heavy local storms.
• Construction activities would be subject to standard Forest Service best management practice (BMPs) contained in FSH 2509.

**Categorical Exclusion FSH 1909.15, 30. Section 30.4 (USDA FS 2010)**

30.4 - Extraordinary Circumstances

Resource conditions that should be considered in determining whether extraordinary circumstances related to a proposed action warrant further analysis and documentation in an EA or an EIS are:
(1) Federally listed threatened or endangered species or designated critical habitat, species proposed for Federal listing or proposed critical habitat, or Forest Service sensitive species;  
(2) Flood plains, wetlands, or municipal watersheds;  
(3) Congressionally designated areas, such as wilderness, wilderness study areas, or national recreation areas;  
(4) Inventoried roadless areas or potential wilderness areas;  
(5) Research natural areas;  
(6) American Indians and Alaska Native religious or cultural sites, and  
(7) Archaeological sites, or historic properties or areas.  

The mere presence of one or more of these resource conditions does not preclude use of a categorical exclusion (CE). It is the existence of a cause-effect relationship between a proposed action and the potential effect on these resource conditions and if such a relationship exists, the degree of the potential effect of a proposed action on these resource conditions that determine whether extraordinary circumstances exist. (36 CFR 220.6(b))

When an action is to be categorically excluded from documentation in an EA or EIS, the responsible official must be able to demonstrate that the action fits within the identified category and that the potential effects on the listed resources are minor or non-existent.

The proposed and alternative actions potentially meet CE Extraordinary Circumstance #2 (Flood plains, wetlands, or municipal watersheds).

Alternatives and Mitigation Measures

Analysis Process

Subsequent to receiving the request to implement the Proposed Action from AGFD, the TNF established an interdisciplinary team (IDT) in August 2010 to assist the TNF in determining the appropriate level of project review and environmental consequences of the Proposed Action, and to aid TNF in complying with Forest Service (FS) Manual and Handbook direction. The IDT reviewed and concurred with the findings of the NCD reports describing current conditions of the stream segments within the project area. The initial IDT review found the Proposed Action would not substantially impede, divert, or impound stream flows, or negatively effect soil and watershed resources.

This action was originally listed as a proposal on the TNF Schedule of Proposed Actions (SOPA) published January 1, 2011, and updated periodically during the analysis. Public and agency scoping for the Proposed Action began on December 22, 2010 with the release of a scoping letter. Scoping information was mailed to 39 agencies, and organizations. Comments were requested by January 31, 2011.

At the completion of the scoping period, comment letters were received from the White Mountain Apache Tribe, Grand Canyon Chapter of the Sierra Club, and the Arizona Department of Environmental Quality. The Arizona Department of Environmental Quality was neutral toward the project, stating that project activities may require a Clean Water Act Section 404 permit issued by the US Army Corps of Engineers and also an Arizona Pollutant Discharge Elimination System’s Construction General Permit issued by the Arizona Department of Environmental Quality, Water Quality Division.
No extraordinary circumstances or substantial affects to soil and watershed resources where identified during agency and public scoping.

**Effects Analysis**

**No Action Alternative**

Under the No Action Alternative, current management plans would continue to guide management of the project area. No aquatic habitat enhancement or trail improvement activities would be implemented to accomplish project goals. Portions of these watersheds have been affected by fires which burned a high percentage of the watershed, removing much of the vegetative cover and creating a destabilized condition from sediment runoff. These conditions would remain unchanged under the No Action Alternative. Riparian vegetation along the stream banks is likely to reestablish over time. However, the No Action Alternative would likely result in no direct effects and minor indirect adverse effects on soil and riparian conditions due to the continuation of concentrated angler use near FS campgrounds. Restoration of deteriorated stream segments from effects of fires within the watersheds would not occur.

**Proposed Action**

Short-term minor direct adverse effects on water quality due to temporary disturbance of the stream channel and riparian soils would result from the placement of aquatic habitat enhancement structures and bank planting within Canyon, Haigler and Christopher Creeks and spawning gravel in Canyon Creek. These impacts would be minimized by implementing standard Forest Service BMPs (USDA 1991) and project-specific conservation measures. Long-term moderate indirect beneficial effects on watershed resources, soils and hydrology would result from placement of in-stream structures and bank plantings. Over time, such beneficial effects would include stabilization of the stream banks, diffusion of the energy of high floodwaters, and reduction of adverse effects from scouring and sediment movement.

**Cumulative Effects for all Alternatives**

Cumulative effects are defined as effects that result from the incremental impacts of an alternative when added to other past, present, or reasonably foreseeable actions. This analysis relies on current environmental conditions as a proxy for the impacts of past and present actions, because existing conditions reflect the aggregate impact of all prior human actions and natural events. Projects included in the TNF, Pleasant Valley and Payson Ranger Districts Second Quarter 2011 Schedule of Proposed Actions was considered for the cumulative effects analysis as reasonably foreseeable actions. The projects include:

**Bar X, Colcord Canyon, Haigler Creek, Young, Marsh Creek Allotments.** Current authorizations for livestock grazing on five allotments and a segment of the Sheep Driveway have or soon will expire. A new management strategy will allow for flexibility to protect resources in response to changing environmental conditions.

**Haigler Fuels Analysis EA.** Manage timber and other woody vegetation to help maintain forest health, reduce forest fuels, and improve wildlife habitat and range conditions on approximately 43,435 acres of the Tonto National Forest.

**Myrtle Wildland Urban Interface EA.** The purpose is to manage hazardous fuels, both live and dead fuels, in order to reduce the potential of catastrophic wildfire. Need is to address the present fuels threat posed to human life, property and natural resources.
Personal Use Small Products Program – 2011. Personal use cutting and/or gathering of forest products.

Pine/Hog Canyon Allotment Management Plan Revision EA The Pine and Hog Canyon allotments are managed together as one unit. The current Allotment Management Plan was approved in 1985 and is in need of update and revision. New plan may adjust cattle numbers, and include new range improvement practices.

Reasonably foreseeable actions within the Project Area also include ongoing USFS management activities related to timber harvesting, grazing allotments, wildfire management, and recreation. Additional past, present and ongoing activities include:

*Past Actions*

- Trout stocking in Tonto Creek and its tributaries

*Present/Ongoing Actions*

- AGFD fish-stocking program (stocking nonnative trout along Canyon, Haigler, and Christopher Creeks as outlined in the AGFD Sport Fishery Program)
- Recreational opportunities (e.g., off-road vehicle use, controlled camping, dispersed camping, hunting, fishing activities)
- Livestock grazing
- Canyon Creek Fish Hatchery

*Reasonably Foreseeable Future Actions*

- Aquatic enhancement/restoration projects along Tonto Creek
- Wildland Urban Interface (WUI) treatments (Christopher/Hunter and Myrtle WUIs)

Timber, wildland fire, grazing, and recreation have the greatest effect on soils within the TNF. Projects occurring on the TNF require the analysis of soil and watershed impacts, as well as recommendations regarding appropriate avoidance or minimization measures if adverse impacts are identified. In addition, projects are evaluated for conformance with the 1985 TNF Plan and must implement Forest Service BMPs (USDA FS 1991), which provide additional protection for soil and watershed resources.

The Forest Plan stipulates management objectives for these management activities as applicable to areas that are within lands classified as 4D, 5D, and 5G within the TNF Plan. The Proposed Action would likely result in long-term beneficial effects on soil and watershed resources, but such beneficial impacts would be localized within the project area. When considered with the above past, present, and reasonably foreseeable future actions, the Proposed Action would have a neutral cumulative impact on soil and watershed resources.

*Determination*

This action responds to the goals and objectives outlined in the 1985 TNF Plan and helps move the project area toward desired conditions described in that plan. The proposed action would be anticipated to improve habitat for wildlife, specifically aquatic and riparian obligate wildlife species and sustain recreational fishing opportunities. However, the effectiveness of riparian planting, particularly in Canyon Creek, is probably dependent to some degree on the extent of browsing by elk. The proposed project would enhance the creeks by improving habitat quality and fishing experience in these heavily utilized recreational fisheries. Proposed improvements to each
creek will include the creation of pools through the use of log and boulder complexes, and planting will occur in an effort to produce additional vegetative cover.

Project detrimental impacts on soil and watershed resources and the effects of sedimentation on the watershed would be minor and occur in a very small area. Project long-term beneficial effects would be greater than the short term detrimental effects. No past, present, or reasonable foreseeable projects are anticipated to occur within the same area or during the same time that would cause additional impacts on soils or watershed resources in the Project Area.

Prepared
By: Richard Remington, Logan Simpson Design Inc
Date: July 28, 2011

Reviewed
By: Grant Loomis, Tonto National Forest Hydrologist
Date: ____________________
Figure 1: Canyon Creek Project Area
Figure 2: Haigler Creek Project Area
Figure 3: Christopher Creek Project Area
References


Natural Channel Design, Inc. 2008a. *Canyon Creek Aquatic Habitat Assessment and Enhancement Design*. Submitted to the Arizona Game and Fish Department.

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Natural Channel Design, Inc. 2010b. *Haigler Creek Aquatic Habitat Improvement. Site Assessment Report. Project Number E0075803*. Submitted to the Arizona Game and Fish Department.


