

## **Riparian Area Condition Item 22**

**OBJECTIVE:** Ensure compliance with Forest Plan standards for fisheries, water, and wildlife.

**DATA SOURCE:** Interdisciplinary team reviews and monitoring information from resource specialists.

**FREQUENCY:** One project per District per year.

**REPORTING PERIOD:** 2014-2015

**VARIABILITY:** Deviation from riparian area and fisheries objectives.

### **EVALUATION:**

The Forest Plan's fish and wildlife goals are to provide habitat to support viable populations of native and desirable non-native wildlife and fish, provide for the recovery of threatened and endangered species, and maintain riparian flora, fauna, water quality, and recreation activities. This monitoring item discusses activities and monitoring associated with timber harvest, recreation, fire management, facilities management, grazing, or other forest management activities in riparian areas, all of which can affect riparian function. We cover restoration of riparian areas in Item 19 and fisheries in Items 21 and 41.

Riparian monitoring in 2014 and 2015 exceeded this item's requirement of one project per District per year. Monitored activities include multiple projects related to developed and dispersed recreation sites, outfitter and guide camps, fire management, irrigation ditches and diversions, grazing, weed management, timber management, and activities related to implementation of the Burned Area Recovery decision. Project and activity specific key findings are presented below for each of these monitored activities. Clearly, important lessons are being learned and applied. In almost all cases riparian and fisheries objectives are being met or exceeded. In those few cases where problems have been identified, root causes were usually attributable to human error or incorrectly applied practices had limited adverse effects on the riparian and fisheries resources. Most were either corrected upon detection or are scheduled to be remedied.

None of the monitored projects indicate inadequacies in the Forest Plan riparian area and fisheries objectives or protective standards.

### **Developed and Dispersed Recreation**

**Burnt Fork Dispersed Recreation (Stevensville Ranger District):** In 2010, a stable and hardened one-vehicle parking spot was constructed along the road that parallels Burnt Fork Creek (NFR 312). The objective was to provide users an alternative to driving down into the soft streamside soils to park and turn-around. Before the construction, some users also entered the stream with their vehicles. Spots with bare soil and open areas were planted with either a native seed mix or shrub seedlings. Spruce seedlings were planted in these areas in 2011 and 2012. Grasses grew and established themselves well. Shrub and spruce seedling survival was low, about 20%.

The key finding has been that the project successfully provided for continued use by anglers, tent campers, picnickers; it reduced the motorized activity along the stream, and provided a useful parking area for full-sized vehicles. In the first few years people on smaller all-terrain vehicles, such as ATVs and motorcycles, traveled cross-country from the road to the streamside. The effects of these small vehicles that entered the area occasionally in 2012 were nearly invisible in 2013 and have been minor since then. Wind had blown over some large trees making cross-country travel less enticing.

**Willow Creek Dispersed Recreation (Stevensville Ranger District):** Similar to Burnt Fork, a stable and hardened one-vehicle parking spot was constructed along the road that parallels Willow Creek (NFR 364). At this site, before the construction, some users drove vehicles to the stream and dumped garbage over the stream bank. The project maintains the walking access to the stream and a flat campsite. As a result there was very

little vehicle travel along the Willow Creek banks in this area, and garbage dumping is much less than it was when vehicles accessed the stream bank. Seeded and planted vegetation struggle in this dry sandy soil.

**Railroad Creek Dispersed Sites in Upper Skalkaho Creek (Darby Ranger District):** To maintain the availability of the popular dispersed campsites near Skalkaho Creek, while improving stream and riparian conditions, there has been ongoing effort to manage expansion of dispersed camping along sensitive sites such as stream sides.

Railroad Creek is a spawning and rearing tributary of Skalkaho Creek for bull trout and westslope cutthroat trout. There are two dispersed sites that have had work done to them in the past. Both sites need continued monitoring and alteration to avoid potential adverse effects to the fish habitat.

There is a small site near the mouth of Railroad Creek that has been designed for a parking space large enough for a vehicle and small trailer, and walk-in access to the stream. The creek has braided near the mouth and one of these braids flows between the parking area and the walk-in camp site. Some thought was given to altering the stream to eliminate this braid. Observations of the site in 2014-15 were that:

- The braided channels are all stable;
- Visitor can access the camp site without getting their feet wet during low summer flow periods;
- The braided channels between the parking area and the campsite was being used by many trout fry;
- Use by the public appears moderate. Soil compaction and bank (Skalkaho Creek) sloughing and erosion are continuing;
- Planted shrubs and spruce seedlings are surviving and growing slowly; and
- A large spruce tree was cut and removed from the site, probably as a source of firewood.

The second Railroad Creek site is a larger complex of smaller sites. A primary route through the site was hardened in 2011 to establish one route. Secondary routes were decompacted and planted with vegetation. Creating one route has had a positive result. The secondary routes are slowly rehabilitating. The one acre meadow at the end of the route is a constant source of litter dumping and maintenance is required to keep the site acceptably clean and to keep the fire ring empty enough that people will use it rather than creating new rings. One the date visited there main ring was full of ash and debris and two secondary rings had been built and used. Another growing issue is that in 2012 users of the site constructed a ramp down a steep 4-foot erosive soil streambank so that they could access the creek and have a shortcut to FSR 711. Ramps and traffic (foot and small vehicles) have weakened that bank and the erosion rate is increasing. In 2014-15, the Forest plans to do the NEPA planning to restore the integrity of the streambank, and hopes to implement a stream bank restoration project there in 2016.

**Hog Trough Creek Dispersed Sites and Gravel Pit Restoration in Upper Skalkaho Creek (Darby Ranger District):** This area that was previously used as a gravel pit was partially restored in 2013. Restoration included roughening and planted about three acres, removing about 500 feet of near stream road, retaining a gravel storage area and parking for winter recreation, and improving dispersed camping sites by hardening them and flattening them.

Planting in this unforgiving site has been marginally successful. Shrubs seedling survival was about 10%. Of the half-dozen species planted, the most successful appear to be snowberry and kinnikinnick. There were also 6 common weeds becoming more prevalent, including knapweed, oxeye daisy, and thistles. Lodgepole seedlings planted in 2013 and ponderosa pine planted closer to the stream in 2011 varied in their success. There are areas where these young trees appear health and vigorous, others where they are struggling, and other areas where they were planted and are no longer present. Overall the survival of the lodgepole seedlings was approximately 30%.

Roughening the area controlled much of the off road travel, especially near the stream. Hill-climbs, on the far side of the project area and away from the stream, are still illegally used by vehicles and have been re-established. The area contained household garbage broadly strewn through project area, much of it placed as recreational shooting targets and left with bullet holes. There were also 2 piles of yard waste, each approximately 2 cubic yards. One of the dispersed camping sites has grown-in with thick grasses and has not been recently used.

**Dispersed Sites along Upper Skalkaho Creek (Darby Ranger District):** The Forest's intent is to maintain the availability of the popular dispersed campsites along Skalkaho and Daly Creek while improving stream and riparian conditions. Maintaining the streamside conditions favorable to native fish has turned into an ongoing

project because of the annual impacts of dispersed camping and illegal firewood collection that often occur in the streamside areas. In 2010 and 2013, sites at Railroad Creek, and a six others along Skalkaho Creek were partially rehabilitated to off-set recent expansion by users of the sites. An excavator placed boulders to delineate the boundaries for vehicles. The need for repeat treatments is partly due to the changing path of Skalkaho Creek. As the Creek meanders into or closer to the area being used by campers, there is a need to adjust the area to make room for the streams movement. The second reason is that campers tend to expand use in unpredictable directions, sometimes creating impacts on stream banks or high-water channels. There have been a couple of noteworthy successes. Two user-built fords across Skalkaho Creek have recovered to a degree that they are difficult to recognize as fords and have not been used as such. The fords did not access any points of interest; they were simply used for entertainment.

**Dispersed Campsites in the Selway River Drainage (West Fork Ranger District):** In 2013, seven dispersed campsites along the Selway River between Magruder Crossing and Paradise received various rehabilitation treatments. Three sites were decompacted, closed to vehicle use, seeded with grass, fertilized, and slashed. Three sites had boulders placed around their perimeters to define where vehicles can drive and park. One site had a drivable water bar installed at its entrance to prevent sediment from leaving the site during storms. The goal of the treatments is to restore riparian vegetation to the eroding areas near the Selway River and prevent site expansion. In 2014, five of the sites were planted with shrub seedlings. Monitoring conducted during the 2014 and 2015 field seasons indicates that so far, the treatments have been successful in defining and controlling vehicle use. The closed sites have been left alone and are slowly revegetating and healing. The boulder placement sites have not been breached. Survivorship of the shrub plantings appears to be low; the species with the most success has been snowberry. This project will be monitored in 2016.

**West Fork Dispersed Campsite Restoration Project (West Fork Ranger District):** In 2012, the Bitterroot NF conducted a riparian restoration project in a dispersed camping area along the upper West Fork Bitterroot River near the end of the pavement on the West Fork Highway. Boulders were placed around the perimeters of three dispersed campsites to define and control vehicle use, an erosive 0.7-mile long user-created road in the riparian area was graveled, and about 100 beetle-killed lodgepole pine trees were felled into the West Fork to enhance hiding cover for bull trout and westslope cutthroat trout. The goals of this project were to reduce erosion, soil compaction, and sediment sources in the riparian area, stop the expansion of user-created OHV "roads" in the riparian area, and increase hiding cover for bull trout and westslope cutthroat trout in the West Fork. Monitoring conducted during the 2014 and 2015 field seasons indicates that the goals are being met. The graveled user-created road no longer contains signs of surface erosion and sheds water during rain storms without rutting or puddling. Motorized vehicles have not attempted to circumvent the boulders that were placed around the dispersed campsites. The felling of snags into the West Fork Bitterroot River has created woody debris jams and increased hiding cover and habitat complexity for bull trout and westslope cutthroat trout. This project will be monitored in 2016.

### **Our Key Findings from Monitoring Developed and Dispersed Recreation Sites**

- Most of the developed campgrounds and dispersed camping areas on the Forest are located in the RHCA's along fish-bearing streams. This makes them sensitive areas for most management activities. Particular activities of concern are the spraying of herbicides such as carbaryl and hazard tree removal. High levels of mountain pine beetle activity and mortality continues to occur in many of the RHCA's in and adjacent to the developed campgrounds and dispersed camping areas. Mountain pine beetle mortality is particularly heavy along the riparian corridors surrounding the East and West Fork Bitterroot Rivers.
- One of the most common management activities in campgrounds with the potential to impact the fishery is hazard tree removal. This has become much more of an issue in recent years because of beetle mortality. Hazard trees that are close enough to the stream to provide shade and potentially land in the water (typically those within one tree length of the edge of water) are left standing if possible. If too risky to leave standing, hazard trees are directionally felled towards the stream and left on site. Hazard trees that are located more than one tree length from streams are being evaluated by a fisheries biologist on a case-by-case basis. Depending on site conditions, the trees are sometimes felled and left on site, cut into firewood, or removed.
- Many campground visitors fish; therefore, the location of the campgrounds in riparian areas increases fishing pressure on a local scale and probably results in some intentional and incidental mortality of westslope cutthroat trout, bull trout, and juvenile steelhead (in Idaho). The most vulnerable fish are the larger adults. It is not unusual to observe fewer adult westslope cutthroat trout in the segments of streams that are located close to campgrounds.

- User-created roads in riparian areas should be obliterated soon after their detection. If left alone, the road networks tend to expand and become much more difficult to eliminate, both environmentally and socially. Activities detrimental to fish habitat and water quality often occur where user-created roads are present in riparian areas. These activities include illegal cutting of trees within 150 feet of streams, and increased sediment inputs from poorly located and erosive user-created roads and fords.
- Many large, ecologically important trees in the riparian areas are killed by being repeatedly shot. The trees are sometime used as a backstop for targets, or are used as the target. This is especially apparent in or near the dispersed recreation sites on the Darby and Stevensville Districts, probably because there are more people in the vicinity of these Districts. This issue is readily observable at the dispersed recreation area near the junction of Highway 30 and Forest Road 75.
- Forest management activities in developed and dispersed recreation sites on the Forest have generally been consistent with our programmatic agreements with the regulatory agencies (U.S. Fish and Wildlife Service and NOAA Fisheries).

### **Outfitter and Guides**

Fisheries monitoring of outfitter and guide camps did not occur in 2014 and 2015.

### **Fire Management**

Fisheries monitoring of fire and its effect on riparian resources includes both prescribed fire and wildfire suppression activities. In 2014 and 2015, Forest fisheries biologists monitored the following prescribed fires:

- School Point Unit Bravo, burn blocks 1, 2, and 3; West Fork Ranger District (burned in May, 2014)
- School Point Unit Delta, burn blocks 3 and 6; West Fork Ranger District (burned in April, 2015)
- Soda Springs Habitat Improvement Project, units 2, 5, and 6; West Fork Ranger District (burned in April, 2015)

The purpose of our monitoring of prescribed fires is to: (1) document the post-burn condition of the RHCA; (2) look for indications of increased sediment delivery to streams; (3) assess the accuracy of the predictions made in project NEPA documents and biological assessments; and (4) monitor the compliance and effectiveness of mitigation measures in project NEPA documents and the U.S. Fish and Wildlife Service's Programmatic Biological Assessment for Prescribed Burning (U.S. Fish and Wildlife Service, 2001). The results of our monitoring visits are typically documented in unit logs which are available upon request. The monitoring results for the prescribed fires listed above are summarized below.

**School Point Prescribed Burn, Unit Bravo, Burn Blocks 1, 2, and 3 (West Fork Ranger District):** Unit Bravo borders an intermittent segment of Wheeler Creek, which is tributary to the lower Nez Perce Fork. Wheeler Creek was actively flowing when the burn occurred. Burn blocks 1, 2, and 3 were ignited by hand crews on May 2, 2014. About 124 acres in blocks 1-3 were burned, all at low severity. Fisheries biologist review of the burned area occurred on May 15, 2014. A couple of light rain events occurred between the time of ignition and the biologist review.

The only RHCA in Unit Bravo is the 100-foot wide RHCA surrounding Wheeler Creek. Fire was allowed to back down into the Wheeler Creek RHCA, but it made minimal inroads. In most places, the fire went out on its own along the outer half of the 100-foot RHCA. In a few locations, low severity fingers burned to within 10-15 feet of the waterline. Tree mortality in the RHCA is likely to be close to zero. There was no evidence of significant soil erosion and movement occurring. Hand line construction did not occur in the RHCA.



**Photo 1 – Typical Post-Burn Conditions in the Uplands in School Point Unit Bravo, Burn Blocks 1-3, May 2014**



**Photo 2 – Typical Post-Burn Conditions in the RHCA along Wheeler Creek in School Point Unit Bravo, Burn Blocks 1-3, May 2014**

**School Point Prescribed Burn, Unit Delta, Burn Blocks 3 and 6 (West Fork Ranger District):** Unit Delta borders an intermittent tributary (100-foot wide RHCA) to the Nez Perce Fork, and a perennial, non-fish bearing segment of Gemmel Creek (150-foot wide RHCA), which is tributary to the Nez Perce Fork. Gemmel Creek was actively flowing when the burn occurred; the intermittent stream contained a trickle of water. Burn blocks 3 and 6 were ignited by hand crews on April 16 and 17, 2015. About 102 acres in blocks 3 and 6 were burned, all at low severity. Fisheries biologist review of the burned area occurred on May 14, 2015. Several light rain events occurred between the time of ignition and the biologist review.

In block 3, the burn pattern in the RHCA was patchy and of low severity, mostly burning jackpots of fuel accumulations under the trees. The burn was not contiguous, and overall, most of the vegetation in the RHCA was unburned. The closest that the burn got to the edge of the intermittent stream was about 3-5 feet, and that only occurred over a lineal length of a hundred feet or so. Most of that occurred immediately upstream from the FSR 13402 crossing. Over the majority of the RHCA, fire generally stayed > 20 feet from the stream channel. Fire did not cross the stream channel. Tree mortality in the RHCA is likely to be close to zero.

In block 6, the RHCA along Gemmel Creek was unburned with the exception of a few insignificant patches of low severity burn where burning material rolled downhill into the RHCA. Tree mortality within the RHCA is likely to be zero.

There was no evidence of significant soil erosion and movement occurring in either of the burn blocks. Hand line construction did not occur in the RHCAs.

The following effects predictions were made in the Fisheries Biological Assessment & Evaluation for the School Point Ecoburn project:

- *Prescribed fire would retain most of the organic duff layer and larger woody debris on the forest floor, and are unlikely to produce hydrophobic soils or create large areas (e.g. >20%) of bare soil across the landscape. Maintaining a duff layer would preserve the infiltration of precipitation, thus limiting the likelihood of overland flow and sediment delivery to fish habitat – Our monitoring supported these predictions. The duff layer was not consumed and functioned properly during the rain events that followed the burns. Most of the larger woody debris on the forest floor was blackened but not consumed, and exposure of bare soil was negligible. There were no signs of soil erosion, overland flow, or sediment movement. The burn blocks have a low risk of significantly eroding during future storm events.*
- *The burn would generate insignificant sediment increases to fish habitat and maintain other stream processes such as woody debris recruitment, pool formation, shade, and water temperature –*

Monitoring supported these predictions. There were no indications of erosion or sediment moving towards streams. Based on the general lack of burned soils in the RHCAs, the presence of good unburned vegetative buffer between the burned soils and streams, and the fact that the affected streams are either small (Gommel Creek) or intermittent (Wheeler Creek) streams that are located at least one mile upstream of the nearest fish habitat in the Nez Perce Fork, the School Point burns are expected to contribute negligible amounts of sediment to fish habitat in the Nez Perce Fork. None of the burns will result in woody debris recruitment to fish habitat. The burns maintained shade cover on streams. The burns will have no effect on stream processes in the Nez Perce Fork such as woody debris recruitment, pools, shade, and water temperature.

- *Use of prescribed fire near streams may create small, patchy openings in the riparian canopy in scattered locations. However, the creation of large, contiguous openings in the riparian canopy is unlikely to occur because there is a low potential for crown fire in the moister riparian areas during the burning windows* – Monitoring supported these predictions. The burn did not create openings in the riparian canopy.

In conclusion, the Fisheries Biological Assessment & Evaluation predicted that the School Point Ecoburn project would have an insignificant effect on water quality and the fishery. Monitoring of Units Bravo and Delta supported those predictions. The mitigation measures in the Programmatic Biological Assessment for Prescribed Burning (U.S. Fish and Wildlife Service, 2001) were properly followed during the School Point burns.

**Soda Springs Habitat Improvement Project, Units 2, 5, and 6 (West Fork Ranger District):** The interior of unit 6 contains an intermittent stream (50-foot wide RHCA); the western side of unit 6 borders an unnamed, non-fish bearing, perennial tributary to the Little West Fork (150-foot wide RHCA). Units 2 and 5 do not contain RHCAs. The intermittent stream was carrying a small amount of surface flow at the time of the burn; the perennial tributary to the Little West Fork was actively flowing. The intermittent stream goes subsurface on private land a short distance downstream from the Forest boundary on the Nez Perce valley bottom.

Units 2, 5, and 6 were ignited by hand crews on April 20, 2015. About 240 acres were burned in units 2, 5, and 6. Fire severity was low. Fisheries biologist review of the burned area occurred on May 14, 2015. Several light rain events occurred between the time of ignition and the biologist review.

Along the intermittent stream, the fire mostly went out before it could back into the 50-foot RHCA. Where fire did back into the RHCA, it usually stayed close to the outer edge of the RHCA and created some scattered, low severity burn patches of fuel accumulations under trees. Directly above and below the FSR 13487 crossing, there were some small patches where fire burned to the water's edge and crossed the stream channel. These areas were more open and slash loaded because of the roadside fuel breaks created in August 2013 during the Gold Pan Fire. Despite crossing the stream channel, fire severity was still low. Overall, tree mortality in the 50-foot RHCA is likely to be close to zero.

Along the perennial tributary to the Little West Fork, below the crossing of FSR 13487, fire generally avoided backing into the RHCA with the exception of some small and scattered patches of low severity burn caused by rolling material. Fire did not burn to the water's edge or cross the stream channel. Above the crossing of FSR 13487, there were some small and scattered patches where fire burned to the water's edge and crossed the stream channel. Fire severity was still low. Overall, tree mortality in the 150-foot RHCA is likely to be close to zero.

There was no evidence of significant soil erosion and movement occurring in units 2, 5, and 6. Hand line construction did not occur in the RHCAs.

The following effects predictions were made in the Fisheries Biological Assessment & Evaluation for the Soda Springs Habitat Improvement project:

- *The Soda Springs project is expected to have a negligible and undetectable effect on the fishery* – Monitoring supported this prediction. The intermittent stream in the interior of unit 6 does not contribute sediment or water to downstream fish habitat. It goes subsurface a short distance downstream from the Forest boundary. The perennial stream that forms the western border of unit 6 does contribute sediment and water to downstream bull trout and westslope cutthroat trout habitat in the Little West Fork. However, the vast majority of its RHCA was unburned, and the small areas where fire did burn to the water's edge and cross the stream channel are of low severity (i.e. intact duff layer), and are located more than half a mile upstream from the Little West Fork. There were no indications of significant rilling or soil erosion in the burned areas. For those reasons, it is highly unlikely that the unit 6 burn would contribute measurable amounts of sediment into fish habitat in the Little West Fork.

- *Project activities are expected to generate insignificant sediment increases to fish habitat, and maintain other stream processes such as woody debris recruitment, pool formation, shade, and water temperature – Monitoring supported this prediction. See the rationale above for sediment. Woody debris and pool conditions are going to remain unchanged. Reductions in shade along the small, perennial tributary are too small to affect temperatures in a much larger stream such as the Little West Fork.*
- *The prescribed burning would be low intensity and severity and thereby would not consume all duff material throughout the units. Maintaining a duff layer would preserve the infiltration of precipitation, thus limiting the likelihood of overland flow and sediment delivery to fish habitat. Other factors that would minimize the risk of negative effects on the fishery are the high likelihood that it would take several years to burn all of the proposed acres, and there would be numerous patches of unburned terrain within the burn perimeter due to exclusions and fire behavior – Monitoring supported these predictions. Fire severity was low in all of the burn units, and the duff layer was not consumed. Soil erosion is anticipated to be insignificant. There was no evidence of surface erosion, overland flow, and rilling. Most of the larger woody debris on the forest floor was blackened but not consumed, and exposure of bare soil was negligible. For those reasons, the burn units are unlikely to experience significant erosion during future storm events. Only 19% (240 of 1285) of the acres proposed for burning in the Soda Springs project were treated in this entry, and the burn pattern was not contiguous. There were unburned patches of vegetation scattered throughout the units, particularly in the RHCAs. .*
- *Use of prescribed fire near streams may create small, patchy openings in the riparian canopy in scattered locations. However, the creation of large, contiguous openings in the riparian canopy is unlikely to occur because there is a low potential for crown fire in the moister riparian areas during the burning windows – Monitoring supported this prediction. It appears that there will be essentially no overstory tree mortality in the burn units.*

In conclusion, the Fisheries Biological Assessment & Evaluation predicted that the prescribed burning in the Soda Springs project would have a negligible and undetectable effect on the fishery. Based on our monitoring observations, that prediction was accurate.

### **Our Key Findings from Monitoring Prescribed Fires**

- Most of the acreage in prescribed fire units burns at low severity with no long-term detrimental effects to the duff layer, which is why we often see no evidence of significant soil erosion or sediment movement into streams. In spring burns, prescribed fire typically burns RHCAs in a very spotty and low severity manner, if they burn at all. Spring burns pose a lower risk to RHCAs than fall burns.
- The Forest implements the mitigation measures in the U.S. Fish and Wildlife Service Programmatic Biological Assessment for Prescribed Burning (U.S. Fish and Wildlife Service, 2001). Those mitigation measures have been effective in keeping effects to the aquatic ecosystem at insignificant levels.

In 2014 and 2015, Forest fisheries biologists monitored the effectiveness of post-fire rehabilitation activities in the following wildfires:

- Gold Pan Complex Wildfire; West Fork Ranger District (July-September, 2013)
- Indian Ridge Wildfire, West Fork Ranger District (August-September, 2012)

The purpose of our monitoring of wildfires is to: (1) determine if emergency ESA consultation is needed for fire suppression activities; (2) document fire effects on fish populations and habitat; and (3) ensure that suppression rehabilitation activities are properly implemented and document their effectiveness. Forest fisheries biologists frequently serve as resource advisors for the wildfires that are fought with Type 1 or Type 2 suppression teams. The monitoring results for the wildfires listed above are summarized below.

**Gold Pan Complex Wildfire (West Fork Ranger District):** The Gold Pan Complex Fire burned about 41,775 acres in the upper Selway River drainage (Idaho) and upper Blue Joint Creek drainage (Montana) in July, August, and September 2013. 92% (38,290 acres) of the fire occurred in the Idaho wilderness; the remaining 8% (3,485 acres) burned in the Jack-the-Ripper area of the Blue Joint Creek drainage. The predominant burn pattern was mixed severity, but there were also some sizeable patches of high severity. The fire was fought by a series of Type 1 and 2 teams in July, August, and September 2013. Fire suppression actions were limited due to the fire largely occurring in designated wilderness or wilderness study area lands.

In Idaho, suppression actions consisted of constructing 4.2 miles of hand line and a couple of small helispots, doing a small amount of manual thinning along the Hells Half Acre road, felling some hazard snags along the Deep Creek road, installing heli-wells for helicopter dipping at Magruder and along Deep Creek, and doing structure protection around developments such as Magruder, Storm Creek outfitters base camp, Kim Creek Saddle, developed campgrounds, and bridges. All of the hand line was recontoured and covered with slash after use. There were no significant fire suppression impacts in riparian areas. Retardant was not dropped within RHCAs.

In Montana, fire suppression actions consisted of constructing 4.6 miles of machine fire line (using a clipper and excavator), constructing 2.1 miles of hand line, and creating fuel breaks along existing roads with a clipper, hand crews, and a chipper. Very little of the machine or hand fire line was located in RHCAs. Hand lines crossed Nelson Creek and Christisen Creek at stable locations that were recontoured, seeded, and covered with slash after use. The machine line was primarily located on upland ridges. The machine line was recontoured with the excavator and clipper after its use, then seeded, fertilized, and covered with slash. Weed-free straw mulch was placed on a few of the steeper pitches of machine line near intersections with roads. All of the machine and hand lines were rehabbed by the first week of November, 2013. Emergency consultation with the U.S. Fish and Wildlife Service was not initiated because the suppression actions were determined to be “not likely to adversely affect” bull trout. There were no significant fire suppression impacts in riparian areas. Retardant was not dropped within RHCAs.

The recontoured machine lines and hand lines were monitored during the 2014 and 2015 field seasons. Significant erosion was not observed on the recontoured lines, and the recovery of grass cover was satisfactorily progressing in most areas. Nothing was observed that posed a threat to fish habitat quality or riparian integrity.



**Photo 3 – Recontoured Gold Pan Fire Feller Buncher Line in the Soda Springs Creek Drainage, October 2013**



**Photo 4 - Same Line after One Growing Season, September 2014**

Intense thunderstorms on August 14, 2014 triggered six large debris flows in the Deep Creek drainage. The debris flows were centered around the Scimitar Creek drainage on the north side of Forest Road 468. A two mile long segment of Forest Road 468 was intermittently buried in about half a dozen spots with alluvial material to a depth of 3 to 10 feet. The Bitterroot NF road crew spent about a month removing the alluvial material from the road surface. They installed several new culverts in the ephemeral and intermittent draws that were scoured to bedrock and now contain surface flows, and also graveled the road stream crossings.



**Photo 5 – Gold Pan Fire Debris Flow in the Deep Creek Drainage, August 2014**



**Photo 6 - Forest Road 468 Crossing of Scimitar Creek after the Debris Flows. The 2013 Fish Culvert is Buried near the Large Boulder in the Photo, August 2014**

Scimitar Creek was electrofished in August, 2014, a few days after it was wiped out by a large debris flow, and in July 2015, close to one year after the debris flow. The only surviving organisms that were found in both years were a few adult tailed frogs. The small westslope cutthroat trout population that resided in Scimitar Creek prior to the debris flow was extirpated. The debris flow paved the entire stream bottom with alluvial material (e.g. in 2014, the deepest pool was only about three inches in depth). Several active headcuts were cutting into the stream channel. The new fish passage culvert that was installed at the mouth of the Scimitar Creek in 2013 was completely filled with alluvial material and buried to a depth of about ten feet. A temporary culvert is currently installed at the Road 468 crossing, but a fish passable culvert will need to be re-installed for westslope cutthroat trout to be able to recolonize Scimitar Creek in the future.

**Indian Ridge Wildfire (West Fork Ranger District):** The Indian Ridge wildfire burned the headwaters of Washout Creek at high severity in August and September, 2012. An August 29, 2013 thunderstorm on the burned areas triggered four small mudslides in Washout Creek and its nearby intermittent draws. The slides downcut the affected stream channels, overtopped Forest Road 6223 with a large blockage of mud and debris, and dumped a large quantity of sediment and wood into the Selway River just upstream of the Spire Rock pool. The pool was filled with sand and gravel substrates after the event, and the river ran turbid for several weeks. The Bitterroot NF road crew cleared the alluvial material from Forest Road 6223, and the downcut draws and new alluvial fans were seeded with grass, fertilized with an organic fertilizer, and mulched with weed-free straw.

In summer 2014, the rehabbed alluvial fans were monitored. The sites healed considerably in just the first year. Much of the sediment and gravel that was deposited within the Selway River and its bankfull channel, and all of the large wood, was flushed from the area, including the majority of the sand and gravel that had filled the Spire Rock pool. Grass growth on the alluvial fans and downcut draws is progressing well.

In summer 2015, vegetative recovery continued to progress well. The material that had previously filled the Spire Creek pool has largely been flushed out of the area. Vegetative recovery of the washed out draws has proceeded to the point that the casual forest visitor driving by on the road would not notice anything.



**Photo 7 – Intermittent Draw near Washout Creek, October 2013**



**Photo 8 – Same Draw after One Growing Season, September 2014**



**Photo 9 – Alluvial Fan and Woody Debris from Debris Flows in the Selway River, October 2013**



**Photo 10 – Same Spot nearly a Year Later, September 2014**

**Our Key Findings from Monitoring Wildfire Suppression Actions**

- From the riparian perspective, digging hand fire line is preferable to building machine fire line. However, if machine fire line must be constructed, it is much more preferable to use the combination of an excavator and clipper than a traditional bull dozer. The clipper/excavator combination causes less disturbance to the soil and vegetation and is easier to rehab.
- Using an organic fertilizer during fire rehab activities increases costs, but it is very helpful in getting a positive response from the grass seed the following growing season. The organic fertilizer is especially helpful in getting grass re-established on compacted sites such as parking areas and drop points.
- Fire suppression teams have done a good job in recent years of avoiding RHCAs when constructing machine fire line. The avoidance of RHCAs during machine line construction and retardant drops is one of the main reasons why emergency consultation with the U.S. Fish and Wildlife Service was not initiated during the 2011 Saddle Complex Fire, the 2012 Chrandal Creek and Mustang Complex Fires, and the 2013 Gold Pan Complex Fire.

## Irrigation Ditch Management

**Blake Highline Ditch (Stevensville Ranger District):** This head gate and ditch diverts water to the north from Sweathouse Creek. The private operator of the water system, and the fish biologist coordinate their obligations set by the settlement agreement in 2012. 2014 and 2015 were the third and fourth years of operation for the reconstructed headgate, fish screen, ditch, and flume.

The Forest continued a successful working relationship with the irrigators in 2014 and 2015; and objectives that provide water use and conserve fisheries are being met. On July 28, 2014, Sweathouse Creek was 17 cubic feet per second (cfs) in the stream. According to the Operation and Maintenance Plan, at 19 cfs the ditch is turned down to 1 cfs. The water user's representative shut the headgate the next day. As he has said in the last few years, when the flow allowed in the ditch goes to 1 cfs it makes more sense to shut it completely down because 1 cfs in the ditch does not overwhelm the leakage and the water entering the ditch would be unused. In 2015, the headgate was shut down in early July due to the low stream flows resulting from a poor snowpack.

The fish screen appeared on 4 visits per season in 2014 and 2015 to be 100% effective at keeping fish from entering the ditch and for allowing water to enter the ditch. Near the end of the 2012 irrigation season, several fish were seen on the wrong side of the fish screen. A gap under the screen allowed fish to get through. The 2013-15 irrigation seasons were successful in terms of keeping the fish screen operational. The screen appeared to be 100% effective at keeping fish out of the ditch.

**Fish Screen at the Long Conner A Ditch (Darby Ranger District):** The headgate, a short section of flume and ditch of the upper Long Conner Ditch at Chaffin Creek washed away in a flood in early November, 2006. The ditch owners proposed and the Forest authorized the point of diversion (POD) to be moved upstream to get water into the ditch. The owners of the ditch (a private party) agreed to install a fish screen to benefit the fisheries resource and expedite the consultation process with the USFWS. In 2011, ditch managers had completed the survey and design process. Installation of the screen was expected in 2012, but has not occurred. The ranch changed ownership in 2014. The Forest will negotiate with the new owners to install the fish screen in the Long Conner A Ditch.

**Twogood Irrigation Ditch (Sula Ranger District):** The Twogood ditch exits the north bank of the East Fork Bitterroot River about 500 feet downstream of Jennings Campground. Forest fisheries biologists completed a formal ESA section 7 consultation on the Twogood ditch in 2006. Through the consultation process, the Forest and U.S. Fish and Wildlife Service biologists agreed that the Twogood ditch is "likely to adversely affect" bull trout due to the potential for entrapment. The U.S. Fish and Wildlife Service issued a Biological Opinion in August 2006. The Biological Opinion contained three terms and conditions and directed the Forest to monitor and report for a 5-year period, starting in 2007 and ending in 2011. The Forest completed its formal monitoring requirement in 2011. Although no longer mandated by the U.S. Fish and Wildlife Service, Forest fisheries biologists continued to monitor the Twogood ditch in 2014 and 2015. The ditch manager did a good job of maintaining the ¼ inch mesh fish screen on the headgate throughout the 2014 and 2015 irrigation seasons. The ¼ inch mesh screen has been pretty effective at keeping juvenile fishes out of the Twogood ditch (Table 1), but the ¼ inch mesh is too big to stop young-of-the-year fish from entering the ditch. In October 2014, a couple weeks after the ditch had been shut off for the winter, 35 young-of-the-year trout became stranded in a shrinking pool directly below the headgate. The trout were captured via electrofishing and released into the nearby East Fork Bitterroot River. 34 of the trout were young-of-the-year westslope cutthroat trout; one was a young-of-the-year brown trout (Table 1). Bull trout have never been found in the Twogood ditch (Table 1). On July 27, 2015, the Twogood ditch was electrofished, but no fish were found in the ditch. When the ditch was shut down in late October, 2015, no fish were seen in the stranded pool that forms below the headgate. Forest fisheries biologists will monitor the Twogood ditch in 2016.

Table 1 summarizes the species, numbers, and sizes of fish that have been captured in the Twogood ditch during electro fishing surveys

**Table 1 - Fish Captured in the Twogood Ditch**

Date of Survey	Length of Survey	Fish Species Found	# of Fish	Size range
July 13, 2005 (unscreened)	100 m	Westslope cutthroat Mountain whitefish	1 3	3-4" 1-2"
August 24, 2005 (unscreened)	100 m	Westslope cutthroat Brook trout	21 3	1-4" 4-7"
August 6, 2007	100 m	Mountain whitefish	1	2"

Date of Survey	Length of Survey	Fish Species Found	# of Fish	Size range
(screened)				
August 7, 2008 (screened)	100 m	No fish found	0	
September 23, 2008 (screened)	100 m	Westslope cutthroat	2	3-4"
August 6, 2009 (screened)	100 m	No fish found	0	1-1.5"
August 11, 2010 (screened)	100 m	Westslope cutthroat	8	1-4"
		Brook trout	1	4"
		Mountain whitefish	2	1-2"
August 30, 2011 (screened)	100 m	Brook trout	1	4"
October 28, 2014 (screened)	100 m	Westslope cutthroat	34	1-1.5"
		Brown trout	1	2"
July 27, 2015 (screened)	100 m	No fish found	0	

**Trollope-Litchford and Trollope-Hawkes Irrigation Ditches (West Fork Ranger District):** The Trollope-Litchford (Litchford) and Trollope-Hawkes (Hawkes) ditches exit the lower mile of Chicken Creek. These ditches were a concern to Forest fisheries biologists because they were unscreened and had the potential to entrain bull trout.

Forest fisheries biologists completed a formal ESA section 7 consultation on the Litchford and Hawkes ditches in 2006. Through the consultation process, the Forest and U.S. Fish and Wildlife Service biologists agreed that the ditches are "likely to adversely affect" bull trout due to the potential for entrainment. The U.S. Fish and Wildlife Service issued a Biological Opinion in November 2006. The Biological Opinion contained five terms and conditions that directed the Forest to monitor and report for a 5-year period, starting in 2006 and ending in 2010. The Forest completed those monitoring and reporting requirements in 2010.

On July 31, 2012, the U.S. Fish and Wildlife Service issued a new amended Biological Opinion which authorizes continued use of the Hawkes ditch for another five years. The amended Biological Opinion only provides ESA coverage for the Hawkes ditch – not the Litchford ditch. The Litchford ditch was not covered in the amended Biological Opinion because it has not been screened or obtained a Ditch Bill Easement (the Hawkes ditch has). The Forest and U.S. Fish and Wildlife Service agreed that ESA consultation for the Litchford ditch would be re-initiated when NEPA for a Special Use Permit is conducted.

The amended Biological Opinion for the Hawkes ditch contains five terms and conditions which the Forest is to monitor for another 5-year period, starting in 2012 and ending in 2016. The terms and conditions are listed below, along with our monitoring results from the 2014 and 2015 field seasons.

**Term and Condition #1 (TC1):** If the full amount of deeded water (1 cfs) is removed from the Hawkes ditch, evaluate fish passage and habitat conditions for physical barriers and degraded habitat conditions

The amount of water removed from the Hawkes ditch in 2014 and 2015 was similar to previous year's operations (approximately 0.3 cfs) and well below the full deeded amount of 1 cfs. There do not appear to be fish passage problems in Chicken Creek at the 0.3 cfs removal level, nor is habitat significantly degraded.

**Term and Condition #2 (TC2):** Implement the proposed action as described in the Biological Opinion, including the Forest's monitoring activities of the operation and maintenance of the ¼ inch fish screen on the Hawkes ditch during the irrigation season, and/or other times when water withdrawals are occurring

The proposed action is to allow permitted water withdrawals to occur from the Hawkes ditch with the existing ¼ inch mesh fish screen installed, and conduct monitoring for the next 5 years (2012-2016). The Forest has committed to conducting the following monitoring activities:

1. Electroshock the Hawkes ditch at least once per summer, starting in 2012 and continuing until 2016.
2. Visually inspect the screen on the Hawkes ditch at least three times per ice-free field season (April thru November). Ideally, one inspection would occur at high flows, one at moderate flows, and one at low flows. The purpose of the inspections would be to determine and document if the screen is properly

attached, sealed to the headgate, identify gaps in the screen, and if gaps are found implement corrective actions as soon as practicable. The inspections would start in 2012 and continue until 2016.

Permitted water withdrawals occurred at approximately the 0.3 cfs water level throughout 2014 and 2015.

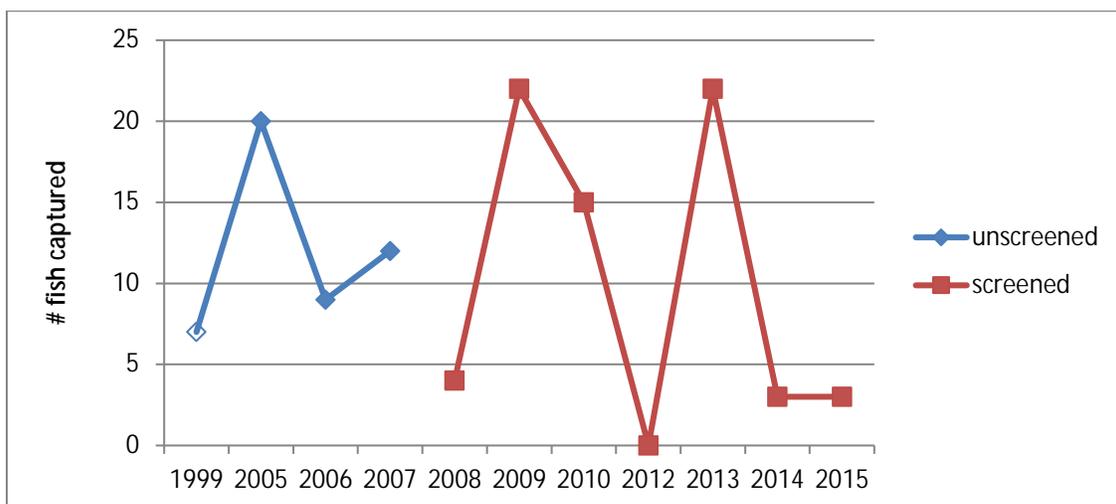
In 2014, Forest fisheries biologists electroshocked the Hawkes ditch on August 11<sup>th</sup> (Table 2), and inspected the fish screen on four occasions: August 11<sup>th</sup>, August 18<sup>th</sup>, October 27<sup>th</sup>, and November 19<sup>th</sup>. The first three visits occurred at low flows; the November visit occurred during an early outbreak of Arctic air which froze the entire surface of the ditch with only a small amount of water flowing under the ice. The headgate area was completely frozen, and the ditch owner had lifted the fish screen out of Chicken Creek to protect it from ice scouring. Only a trickle of water was flowing through the open headgate under the ice. A small gap was detected along the bottom of the screen on the October 27<sup>th</sup> visit. Gaps were not found on the August visits. When gaps are found, they are plugged with sand and gravel substrates; however, the current keeps trying to re-open the gaps and they have not been easy to eliminate.

In 2015, Forest fisheries biologists electroshocked the Hawkes ditch on July 28<sup>th</sup> (Table 2), and inspected the fish screen on three occasions: June 29<sup>th</sup>, July 28<sup>th</sup>, and October 1<sup>st</sup>. The June 29 inspection occurred at moderate flow levels; the July 28 and October 1 inspections occurred at low flows. The ¼ inch mesh fish screen was properly attached and sealed to the headgate on all of the inspections. A small gap about 0.5" wide was present along the bottom of the screen during the June 29 and October 1 inspections. This has been a recurring problem during most of the years that the screen has been in place. Scour periodically opens the gap, then the ditch owner or we plug the gap with substrate material, then the gap stays plugged for a while until scour re-opens it again. A solution we will attempt in 2016 to stop the gap problem will be to dig some masonry bricks into the substrate along the bottom of the screen so that the bottom of the screen sits flush against the smooth surface of the bricks instead of resting on top of the stream's substrate. This may make it more difficult for scour to re-open gaps along the bottom of the screen.

Term and Condition #3 (TC3): Determine if the proposed mesh sizes are effective in reducing entrainment and impingement of juvenile fish. Determine if young-of-the-year bull trout are present in the ditch

The original 2006 Biological Opinion directed the Forest to electrofish the Hawkes ditch annually for a period of five years, starting in 2006 and ending in 2010. The Forest completed this requirement in 2010. The July 31, 2012 amendment directs the Forest to electrofish the Hawkes ditch at least once per summer for another 5 years, starting in 2012 and continuing until 2016. The Forest has completed the first four years of this commitment (2012-15). The 2016 electrofishing survey will complete the commitment in the July 31, 2012 BO amendment.

The Hawkes ditch has been electrofished in the months of June, July, or August for 11 years (1999, 2005-15 – see Figure 1 and Table 2). The ditch was unscreened in 1999, 2005, 2006, and 2007, and screened in all of the years since. The number of fish captured in the ditch has ranged from none to 22 (Figure 1).



**Figure 1 - Total Number of Fish Captured in the Hawkes Ditch**

Since screening, the number of fish captured in the Hawkes ditch has been highly variable (Figure 1). In four of the years (2008, 2012, 2014, and 2015), the screen appeared to be working successfully because only a few fish were found in the ditch (Figure 1). In three of the years (2009, 2010, and 2013), however, numbers were as high or higher than when the ditch was unscreened (Figure 1). The presence and extent of gaps along the bottom edge of screen may explain this variability. Water year does not appear to be playing a role. In the 2015 survey, only three small westslope cutthroat trout were captured in the Hawkes ditch (Table 1).

Bull trout have been found in the ditch in two of the years (2009 and 2014, Table 2). In August 2009, two juvenile bull trout (6.4 inches and 7.1 inches) were captured in the ditch. In August 2014, a 5.5 inch juvenile bull trout was captured in the ditch.

From most common to least common, the species found in the Hawkes ditch have consisted of westslope cutthroat trout (77), brook trout (20), longnose sucker (9), bull trout (3), rainbow trout (3), rainbow X westslope hybrids (3), and slimy sculpin (2) (Table 2). Nearly all of these fish have been small juveniles or young-of-the-year. The rainbow trout and rainbow X westslope hybrids originated from the private pond that the Hawkes ditch flows into.

Table 2 summarizes the species, numbers, and sizes of fish that have been found in the Hawkes ditch during the electro fishing surveys.

**Table 2 - Fish Captured in the Hawkes Ditch**

Date of Survey	Length of Survey	Fish Species Found	# of Fish	Size range
August 23, 1999 (unscreened)	77 m	Westslope cutthroat	1	2-3"
		Brook trout	3	1-4"
		Longnose sucker	1	4-5"
		Slimy sculpin	2	1-2"
July 19, 2005 (unscreened)	100 m	Westslope cutthroat	13	2-9"
		Brook trout	1	2-3"
		Rainbow trout	3	3-5"
		Rainbow X westslope	3	3-5"
June 28, 2006 (unscreened)	100 m	Westslope cutthroat	7	3-5"
		Longnose sucker	2	6-7"
August 2, 2007 (unscreened)	100 m	Westslope cutthroat	7	3-9"
		Longnose sucker	5	5-7"
July 23, 2008 (unscreened)	100 m	Westslope cutthroat	2	3-4"
		Brook trout	1	2-3"
		Longnose sucker	1	4-5"
August 13, 2009 (screened)	100 m	Westslope cutthroat	13	1-7"
		Brook trout	7	2-3"
		Bull trout	2	6.4-7.1"
August 12, 2010 (screened)	100 m	Westslope cutthroat	9	3-5"
		Brook trout	6	1-2"
August 14, 2012 (screened)	100 m	No fish found	0	
August 23, 2013 (screened)	100 m	Westslope cutthroat	21	1-4"
		Brook trout	1	1-2"
August 11, 2014 (screened)	100 m	Westslope cutthroat	1	1"
		Brook trout	1	1.5"
		Bull trout	1	5.5"
July 28, 2015 (screened)	100 m	Westslope cutthroat	3	3-4"

### Our Key Findings from Our Monitoring of TC3

- The objective of the ¼ inch fish screen was to keep bull trout out of the Hawkes ditch and reduce the number of juvenile fish of all species in the ditch. This objective has only been met in about half of the years since the screen was installed. There may be two reasons for this: (1) gaps periodically form along the bottom of the screen as a result of scour. Those gaps allow juvenile fish from Chicken Creek to enter the ditch; and (2)

some juvenile fish from the private pond that the Hawkes ditch flows into are able to leave the pond and enter the ditch. The pond contains juvenile and adult westslope cutthroat trout and brook trout, and possibly some rainbow trout – which are the same species commonly found in the ditch. It is unknown if the pond contains any bull trout. Juvenile and young-of-the-year trout have been observed swimming back and forth between the pond and the lower part of the ditch. It is unlikely that fish from the pond can swim up the entire length of the Hawkes ditch and enter Chicken Creek.

- Bull trout have not been found in the Hawkes ditch very often, but it has occurred on two occasions (2009 and 2014). A total of three bull trout have been found, with sizes being 5.5, 6.4, and 7.1 inches.
- No fish have been observed impinged on the ¼ inch mesh screen in any years.
- Bull trout numbers are low (generally < 10 fish per 1000 feet) in Chicken Creek near the Hawkes ditch. Brook trout outnumber bull trout by about a 5 to 1 ratio, and some hybrids are present.

Term and Condition #4 (TC4): Provide the Service with the monitoring information of the Hawkes ditch (as described in the proposed action section) annually by March 1

The annual monitoring report for calendar years 2014 and 2015 were sent to the U.S. Fish and Wildlife Service in January, 2015 and December 2015.

Term and Condition #5 (TC5): Notify the U.S. Fish and Wildlife Service within 24 hours if any dead, injured or sick bull trout are found, or if observing destruction of redds

Dead, injured, or sick bull trout, or destruction of redds has not been observed in any years.

**Hawkes Irrigation Pipeline (West Fork Ranger District):** The Hawkes irrigation pipeline is a buried irrigation pipe that exits lower Deer Creek via a screened headgate and provides water for a private pond. The headgate is screened with a ¼ inch mesh fish screen. Forest fisheries biologists have annually monitored the screen and found no problems with fish impingement, gaps forming, or plugging. The screen has been properly installed on the headgate during all visits and appears to be functioning satisfactorily. In over 10 years of monitoring, we have found no problems with the screen. Forest fisheries biologists will monitor the Hawkes irrigation pipeline in 2016.

### **Our Key Findings from Monitoring Irrigation Ditches**

- Very few of the irrigation ditches that exit the Forest are screened, but the Forest has been increasing its efforts in recent years to screen the ditches that have points of diversion on the Forest.
- The number of fish entrained in irrigation ditches across the Bitterroot River basin each summer numbers in the thousands. In the Lost Horse Creek ditch system, a research study estimated that 9,000 fish were entrained in ditches in 2005 and 2006. In the Tin Cup Creek ditch system, the estimate was about 3,000 fish entrained. The most common species entrained was the westslope cutthroat trout.
- Bull trout have been found in eleven irrigation ditches. Bull trout are probably present in more ditches, but their densities are so low that their presence is difficult to detect. The ditches where bull trout have been found are:
  - Hawkes ditch, exits lower Chicken Creek (West Fork Ranger District)
  - Litchford ditch, exits lower Chicken Creek (West Fork Ranger District)
  - Sopher ditch, exits lower Hughes Creek (West Fork Ranger District)
  - Ross #1 ditch, exits lower Nelson Creek (West Fork Ranger District)
  - Ross #2 ditch, exits lower Nelson Creek (West Fork Ranger District)
  - Ross #3 ditch, exits lower Nelson Creek (West Fork Ranger District)
  - Hays ditch, exits lower Nelson Creek (West Fork Ranger District)
  - TCCWSD ditch, exits Tin Cup Creek (Darby Ranger District)
  - Lost Horse Feeder Canal & Clauson-Kramis Ditch, exits Lost Horse Creek (Darby Ranger District)
  - Bass ditch, exits lower Bass Creek (Stevensville Ranger District)
- Fish screens are expensive and high maintenance. The type of screen installed needs to be carefully assessed on a case-by-case basis. It is clearly not practical to install an expensive, self-cleaning 3/32<sup>nd</sup> inch

screen on every ditch that exits the Forest. Our monitoring suggests that on small ditches, passive screens with ¼ inch mesh can be effective in keeping juvenile fishes out of ditches if they are cleaned regularly and effectively sealed along the edges. The ¼ inch mesh is not effective in keeping young-of-the-year fish out of ditches. Passive screens with mesh sizes smaller than ¼ inch (e.g. 3/32<sup>nds</sup> or 1/8<sup>th</sup> inch) have a low likelihood of functioning properly because they tend to clog with floating debris quickly and easily.

- The Forest Service's recent efforts to obtain instream flow rights for stream water on Forest Service lands is absolutely critical to the viability and sustainability of the fishery, particularly given the degraded aquatic conditions that almost universally occur downstream of the Forest boundary across the Bitterroot basin.

## Grazing

There are seven riparian exclosure fences or drift fences that are monitored on an annual basis by fisheries biologists and range specialists on the Sula and West Fork Ranger Districts. The seven fences that are monitored are:

1. Meadow Creek exclosure fence, constructed in 1996 and extended in 2004 (Meadow Tolan grazing allotment)
2. Waugh Creek exclosure fence, constructed in 1998 and extended in 2004-05 (Waugh Gulch grazing allotment)
3. Bugle Creek exclosure fence, constructed in 2000 (Meadow Tolan grazing allotment)
4. Reimel Creek exclosure fence, constructed in 2001 (Camp Reimel grazing allotment)
5. Paradise Campground jack-leg fence, constructed in 2000 (no allotment is associated with this fence)
6. Meadow Creek jack-leg drift fence, constructed in 2005 and extended in 2010 (Meadow Tolan grazing allotment)
7. Coal Creek jack-leg drift fence, constructed in 2007 (Coal Creek grazing allotment)

Each of these fences was monitored in 2014 and 2015. The results are discussed in the following paragraphs.

**Meadow Creek Exclosure Fence (Sula Ranger District):** The Meadow Creek exclosure fence was constructed in 1996 as part of the INFISH action plan. In 2004, the exclosure was extended downstream by another 1750 feet. There are now three separate exclosures that total about 3850 linear feet of stream bank protection (roughly 1750 feet long + 1200 feet long + 900 feet long). The three exclosures are separated by two cattle fords. The upper ford was narrowed and hardened in 2004; the lower ford was narrowed and hardened in 2010. 2015 was the 19<sup>th</sup> consecutive year that the exclosures were operational. 2014 and 2015 were successful seasons. The Meadow Tolan allotment was rested in both years - no cows were in the area, and no cows got inside the fences. Since its construction in 1996, the Meadow Creek exclosure fence has been very effective. The riparian vegetation and stream banks inside the exclosures have recovered to reference conditions. Fisheries objectives were met inside the Meadow Creek exclosure fence in 2014 and 2015. Monitoring will continue in 2016.

**Waugh Creek Exclosure Fence (Sula Ranger District):** The Waugh Creek exclosure fence was constructed in 1998 as part of the Camp Reimel EA. In 2005, the Forest completed a 700-foot long extension on the upstream end of the 1998 exclosure fence. The Waugh Creek exclosure fence now consists of a 700-foot long exclosure and a 1400-foot long exclosure separated by a cattle ford. 2015 was the 17<sup>th</sup> consecutive year that the Waugh Creek exclosure fence was operational. The Waugh Gulch pasture did not receive scheduled grazing in 2014 and 2015, and no cows got inside the exclosure fence. Trespass grazing, which has been a problem in past years, was not evident in 2014 and 2015. The Waugh Creek stream channel inside the exclosure fence has narrowed and healed since 1998, which has produced much better fish habitat than what was present prior to fencing. Fisheries objectives were met inside the Waugh Creek exclosure fence in 2014 and 2015. Monitoring will continue in 2016.

**Bugle Creek Exclosure Fence (Sula Ranger District):** The Bugle Creek exclosure fence was constructed in 2000 as part of a fisheries improvement project. 2015 was the 16<sup>th</sup> consecutive year that the exclosure fence was operational. The exclosure fence functioned effectively in 2014 and 2015. The Meadow Tolan allotment was rested in both years - no cows were in the area, and no cows got inside the fence. The riparian vegetation and stream banks inside the fence continue to show excellent recovery. The stream channel has narrowed and healed, and the willow seedlings that were planted along the stream banks in 2000 and 2001 are growing well. The fence has not shifted livestock impacts to other unfenced areas, and has not concentrated grazing impacts above or below the fence to any great degree. The hardened livestock ford at the upper end of the fence has been effective in reducing bank trampling where livestock cross Bugle Creek. The livestock ford at the lower end

of the enclosure has not been hardened, and it is erosive and a sediment source. However, because the channel has a sharp meander in the ford location, it would be difficult to harden at this time. The ford at the lower end of the fence is being monitored and will be hardened if channel conditions allow in the future. Fisheries objectives were met inside the Bugle Creek enclosure fence in 2014 and 2015. Monitoring will continue in 2016.

**Reimel Creek Enclosure Fence (Sula Ranger District):** In 2001, a five-mile long livestock enclosure fence was constructed around the burned riparian area of Reimel Creek. The upper end of the enclosure fence is located just below the mouth of Wallace Creek; the lower end is located where Reimel Creek exits the Forest. 2015 was the 15<sup>th</sup> consecutive year that the enclosure fence was present. The Reimel Creek pasture was rested for the seventh consecutive year in 2015, and there was no livestock use inside or outside the enclosure, and no trespass. Fisheries objectives were met inside the Reimel Creek enclosure fence in 2014 and 2015. Monitoring will continue in 2016.

The Reimel Creek enclosure fence has had mixed success since it was constructed in 2001. Most of the years have been good years with either no livestock use or only minimal livestock trespass inside the enclosure (e.g. 2001, 2002, 2004, 2006, 2008, 2009, 2010, 2011, 2012, 2013, 2014 and 2015), but there have been a few poor years with widespread livestock trespass and impacts inside the enclosure (2003, 2005, and 2007). In general, the poor years have been hotter and drier than the good years. Riparian conditions along Reimel Creek have substantially improved since the fence was constructed. The stream channel has narrowed, and numerous willow and alder shrubs have re-colonized the stream banks (enough to where beaver have re-colonized portions of the stream bottom). Many of the shrubs originated from 2000-2001 plantings. The fish habitat structures that were constructed in 1999 are still providing good pools and hiding cover. Most of the burned snags that were felled into Reimel Creek in May 2003 (BAR project) are providing decent hiding cover. Hundreds (or maybe even thousands) of new snags have fallen into or across Reimel Creek in the past couple of years. The short sections of Road 727 that were relocated further away from Reimel Creek in 2001-02 and 2005 are stable and have been effective in reducing road impacts on the stream channel. The Reimel Creek enclosure fence is the cornerstone that holds all of these riparian habitat improvements together. With the lack of livestock use in recent years, the Reimel Creek enclosure fence has not been regularly maintained and has had hundreds of snags fall across it. It will need major maintenance before livestock can graze the Reimel Creek pasture again.

**Paradise Campground Jack-Leg Drift Fence (West Fork Ranger District):** The Paradise Campground jack-leg drift fence was constructed in 2000 as part of a fisheries improvement project. 2015 was the 16<sup>th</sup> consecutive year that the fence was operational. The fence consists of a 0.25-mile long wooden jack-leg drift fence that runs along the north bank of Whitecap Creek adjacent to the Paradise Campground in two segments (separated by a gap of intact riparian vegetation). The fence has two goals: (1) keep stock from the campground off of the stream banks along Whitecap Creek; and (2) restore the native riparian community of ponderosa pine trees and hawthorn shrubs to the stream banks. Goal #1 was achieved in all years except 2013 when stock grazing occurred on the stream banks (i.e. inside the fence) in August and September. Goal #2 has been partially achieved. Hawthorn shrubs were successfully re-established on the stream banks in 2009 and are doing well, but only two small (3-4 feet high) ponderosa pine trees have survived from previous planting attempts. Goal #2 will be fully achieved when more ponderosa pine trees become established on the stream banks, which will require more planting. Much of the wood that makes up the fence is deteriorating due to age and decay. It will need replacement soon. Fisheries objectives were met inside the Paradise Campground jack-leg drift fence in 2014 and 2015. Monitoring will continue in 2016.

**Meadow Creek Jack-Leg Drift Fence (Sula Ranger District):** The Meadow Creek jack-leg drift fence was constructed in 2005 along a grazed, upper reach of Meadow Creek. In 2010, the Forest extended the fence 600 feet downstream using partnership dollars awarded by the Montana FWP Sikes program. The purpose of the fence is to reduce livestock bank trampling (Meadow Tolan grazing allotment) along a chronically trampled quarter mile-long section of upper Meadow Creek that contains bull trout and westslope cutthroat trout spawning and rearing habitat. The purpose of the extension is to block off an area where livestock had been able to get around the lower end of the fence in previous years. 2015 was the 11<sup>th</sup> consecutive year that the Meadow Creek drift fence was operational. The fence functioned effectively in 2014 and 2015. The Meadow Tolan allotment was rested in both years, and there were no livestock in the area. The stream channel has narrowed and deepened since the jack-leg fence was originally constructed in 2005. In 2014 and 2015, fisheries objectives were met inside the Meadow Creek drift fence. Monitoring will continue in 2016.

**Coal Creek Jack-Leg Drift Fence (West Fork Ranger District):** The Coal Creek jack-leg drift fence was constructed in 2007 along the north side of Coal Creek above the Forest boundary. The fence is 1100 feet long and contains two wildlife openings that are closed during the livestock grazing season. The purpose of the fence is to protect westslope cutthroat trout spawning habitat from livestock bank trampling. 2015 was the 9<sup>th</sup>

consecutive year that the Coal Creek drift fence was operational. The fence functioned effectively in 2014 and 2015. There were no signs of livestock use inside or outside the fence in both years. The riparian vegetation and stream banks inside the drift fence looked good. In 2014 and 2015, fisheries objectives were met inside the Coal Creek enclosure fence. Monitoring will continue in 2016.

**Meadow Tolan Grazing Allotment (Sula Ranger District):** In 1997, Forest fisheries, watershed, and range specialists established a formal aquatic monitoring plan for the Meadow Tolan, Bunch Gulch, and Shirley Mountain grazing allotments. The monitoring plan (Appendix B in the 1997 Meadow Tolan/Bunch Gulch/Shirley Mountain Grazing Allotments EA) established 13 long-term monitoring reaches. A 14<sup>th</sup> reach was added in 2000. Each reach is 200 feet long, with a total bank length of 400 feet. At the conclusion of the grazing season, the following variables are measured at each reach: (1) the amount of bank trampling, (2) a stream channel cross-section measurement, and (3) photo points or utilization measurements. The monitoring reaches are scattered throughout the allotments in representative areas where grazing occurs. The majority of the reaches are located in the Meadow Creek drainage. 2015 was the 17<sup>th</sup> consecutive year (1999-2015) that the reaches were monitored. Results and trends are discussed in Item 17, Watershed Baseline Monitoring. Monitoring will continue in 2016.

**Waugh Gulch Grazing Allotment (Sula Ranger District):** In 2008, Forest fisheries, watershed, and range specialists established a formal aquatic monitoring plan for the Waugh Gulch grazing allotment. The 2008 Waugh Gulch and Andrews Grazing Allotments EA directed the Forest to conduct fish habitat, stream channel, and vegetation trend monitoring at ten-year intervals at a minimum (EA Monitoring Plan, pages 2-5 and 2-6). In order to accomplish this, six long-term monitoring reaches were established in Waugh Creek, the West Fork of Camp Creek, and several unnamed tributaries to the West Fork of Camp Creek. Each reach is 200 feet long, with a total bank length of 400 feet. At the conclusion of the grazing season, the following variables are measured at each reach: (1) the amount of bank trampling, (2) a stream channel cross-section measurement, and (3) photo points or utilization measurements. The monitoring reaches are located in portions of the allotments that have had considerable livestock use in the past and are sensitive to grazing impacts because of their stream type and fisheries concerns. The purpose of the monitoring is to monitor the effect of livestock on stream stability and provide adaptive management feedback in order to maintain or improve stream channel and riparian conditions.

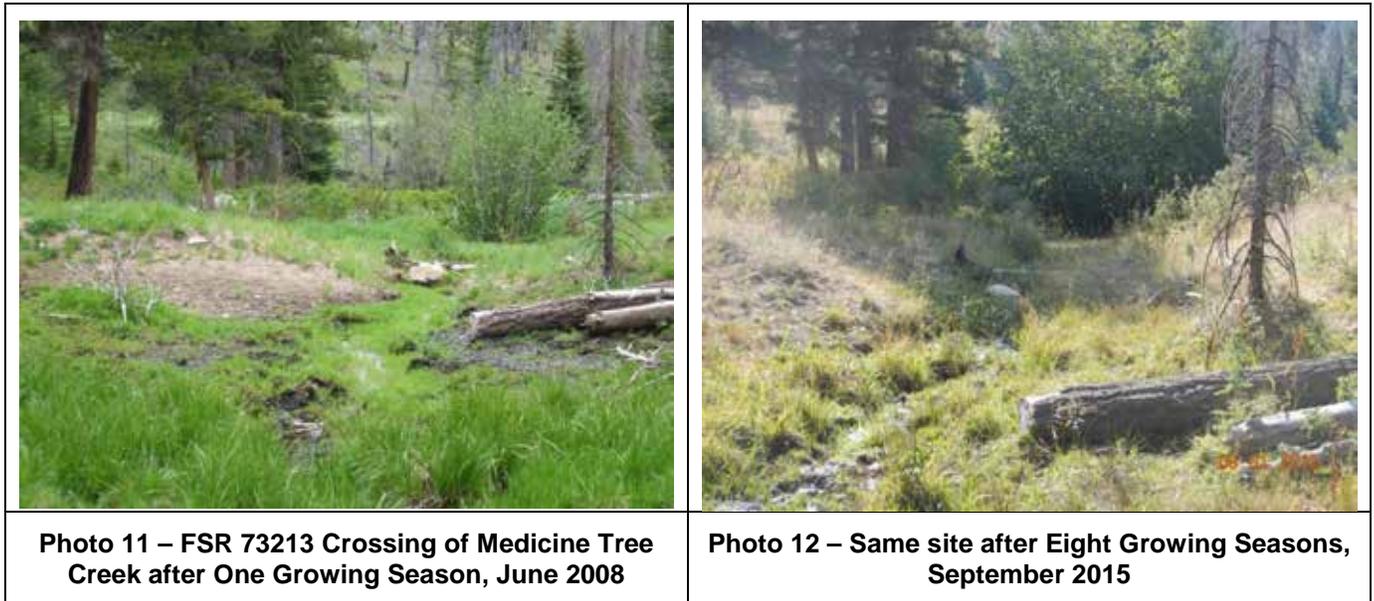
The Waugh Gulch reaches were monitored for the first time in September, 2009, and were monitored again in October, 2015. The Waugh Gulch allotment has not been grazed for at least the past five years. We saw no evidence of livestock presence at any of the Waugh Gulch reaches in 2015. Results and trends are discussed in the Forest Plan Monitoring Report, Item 17, Watershed Baseline Monitoring.

**Sula Peak and East Fork Grazing Allotments (Sula Ranger District):** In 2010, Forest fisheries, watershed, and range specialists established a formal aquatic monitoring plan for the Sula Peak and East Fork grazing allotments. The monitoring plan is included in the Appendix to the 2010 Sula Peak and East Fork Grazing Allotments EA (EA Appendix, pages EA-1, EA-2, and EA-3). The monitoring plan established eight long-term monitoring reaches in Spring Gulch, Colvert Creek, Jennings Camp Creek, Guide Creek, North Fork Lyman Creek, and Cameron Creek. At the conclusion of the grazing season, the following variables are measured at each reach: (1) the amount of bank trampling, (2) a channel stability rating, and (3) a proper functioning condition rating. stream channel cross-section measurement, and (3) photo points or utilization measurements. The monitoring reaches are located in portions of the allotments that have had considerable livestock use in the past or are sensitive to grazing impacts because of their stream type and fisheries concerns. The purpose of the monitoring is to monitor the effect of livestock on stream stability and provide adaptive management feedback in order to maintain or improve stream channel and riparian conditions.

The Sula Peak/East Fork reaches were monitored for the first time in September, 2010 following the 2010 grazing season. Two of the reaches in the Spring Gulch drainage were monitored in 2011 and 2014. All of the Sula Peak/East Fork reaches were monitored in September, 2015. We only saw evidence of 2015 livestock use in the Daniels Horse Pasture portion of Cameron Creek. There was no evidence of livestock presence at any of the other monitoring reaches. Results and trends are discussed in the Forest Plan Monitoring Report, Item 17, Watershed Baseline Monitoring.

**Medicine Tree Grazing Allotment (Darby and Sula Ranger Districts):** There is no formal monitoring plan for the Medicine Tree allotment. Since 2008, riparian conditions have been monitored with photo-points, primarily at the FSR 73213 crossing of Medicine Tree Creek (T2N, R20W, S12, SE ¼; GPS location is NAD 83, N 45.93535° W 114.02246°). FSR 73213 was recontoured by the Forest road crew in 2006 and 2007. The culvert was removed at the FSR 73213 crossing of Medicine Tree Creek, and the drainage was pulled back to match the natural surrounding slopes. Photos was taken at the FSR 73213 crossing in late August or early September in

2010, 2013, 2014, and 2015. In 2015, riparian conditions at the crossing were very similar to what was observed in 2010, 2013, and 2014. Conditions do not appear to be improving much, nor do they appear to be getting much worse. The baseline condition appears to be a moderate amount of bank trampling.



There is a stock tank at the FSR 73213 crossing that is non-functional. This stock tank was also non-functional in 2014. Fixing the stock tank would help take some grazing pressure off of the nearby stream crossing.

There is a small wetland exclosure fence on the uphill side of FSR 5612 that is 0.4 odometer miles from the gate on FSR 5612. The GPS location of the exclosure is NAD 83, N 45.94367° W 114.04572°. The exclosure consists of three strands of barbed wire. In September 2015, there were three cows inside of the exclosure, and they trampled the wetland. The cows got inside by jumping over the top wire which had been pushed down on the east side of the exclosure.

Adjacent to the exclosure, on the downhill side of FSR 5612, was a non-functioning stock tank. The hose leading into the tank was broken.

Riparian conditions in the other adjacent wetlands along FSR 5612 were similar to what typically occurs in the years when the allotment is grazed. There were localized livestock impacts (e.g. increased trailing, vegetation removal, and utilization in a small area), but not larger scale impacts.

**Our Key Findings from Monitoring Grazing Allotments**

- Riparian exclosure fences are an effective tool for protecting important riparian resources within grazing allotments.
- Fenced riparian areas have shown that they respond quickly and positively to the absence of livestock grazing. Considerable recovery of the vegetation and stream banks occurs during the first year of livestock absence, and by year 3 to 5, riparian recovery is generally excellent.
- If regularly maintained, exclosure fences essentially have a 100% chance of achieving recovery goals.
- The most negative aspect to riparian exclosure fences is the annual maintenance commitment; another is the lack of visual “naturalness” on the landscape (most of the fences are made out of conventional steel post and barbed wire) and a generally low potential for disrupting big game movement. In nearly 20 years of exclosure fence monitoring, the only dead animal that we have found hanging by the barbed wire was a red-tailed hawk. There are numerous places where deer and elk jump the fences every year, but we have never found a dead deer or elk caught up in the barbed wire.

## Weed Management

In 2014 and 2015, Bitterroot NF fisheries biologists monitored a limited amount of herbicide spraying along roads and trails in the Selway River drainage. The spraying was conducted under the 2009 Selway Bitterroot Wilderness Invasive Weed Management Project.

In 2014, one spot was found and investigated for a potential violation of the RHCA spray mitigations. That spot was located along the west bank of Cayuse Creek (a tributary to Deep Creek) about 10-15 feet upstream from the Forest Road 468 bridge. Two willow shrubs growing along the stream's edge appeared to have been sprayed with chemicals and were wilting. Based on the appearance and location of the shrubs relative to live water, it was suspected that herbicide may have been sprayed directly on the surface of Cayuse Creek in this location, which would be a violation of the RHCA spray mitigations in the 2009 Selway Bitterroot Wilderness Invasive Weed Management Project. Photos of the willow shrubs were shown to the Bitterroot NF range specialists who supervise the herbicide spraying program. The specialists agreed that the shrubs had gotten hit with some herbicide. However, they also felt that the sprayer (a contractor) did not violate the RHCA spray mitigations because he used an authorized aquatic chemical that could be sprayed right up to the edge of the stream. In the opinion of the range specialists, the contractor did not directly apply chemicals to the stream's surface. Assuming that is true, then no other potential RHCA spray violations were observed along the road ditches and trails that were monitored in 2014.

In 2015, roadside herbicide spraying along the Deep Creek (FSR 468) and Selway River (FSR 468 and 6223) roads was monitored for compliance with the RHCA spray mitigations. A spray line of dead/wilted vegetation was discernable along the edges of the Deep Creek and Selway River roads. From the appearance and location of the spray line, it appears that the RHCA spray mitigations were satisfactorily implemented. There were no indications of spraying occurring down to the water's edge or over water.

### Our Key Findings from Monitoring Herbicide Treatments

- Our monitoring of herbicide projects has been limited over the years, but the available evidence that we do have suggests that water protection mitigation measures have generally been followed.

## Timber Management

In 2014 and 2015, Forest fisheries biologists monitored the following timber sales:

- Three Saddle Timber Sale (started in 2014; ongoing in 2015)
- Lost Trail Ski Area Sanitation Salvage Sale (completed in 2013)
- Fales Flat Campground Salvage Sale (completed in 2014)
- Trapper Creek Job Corps Center Thinning (completed in 2015)
- West Fork REC (Ravalli Electric Co-op) Powerline Clearing (started in 2015)
- Hughes Creek Fuel Wood (completed in 2015)
- Burned Area Recovery (timber portion completed in 2007; watershed portion still ongoing)

The purpose of our monitoring was to: (1) verify protection of the RHCAs; (2) look for indications of sediment delivery to streams; (3) monitor log hauling conditions; (4) document the application and effectiveness of the fisheries mitigation measures; and (5) assess the effects analysis predictions made in project NEPA documents and biological assessments. The results of our monitoring were documented in individual unit logs for each visit, which are available upon request. The monitoring results for each of the sales are summarized below.

**Three Saddle Timber Sale (Stevensville Ranger District):** This timber sale is occurring along the Sapphire crest in the Ambrose Creek drainage. Harvest operations started in 2014 and continued through 2015. In late January and early February 2015, winter haul road conditions were monitored on the segment of FSR 428 that closely parallels Ambrose Creek. In autumn 2014, about a month prior to the start of winter hauling operations, 19 road drainage points were flagged for monitoring along the segment of FSR 428 that closely parallels Ambrose Creek. These points were located where the road prism was most effectively shaped to get melt water and storm runoff off of its surface. The points considered the shape of the road and the whether there was a vegetative buffer between the road shoulder and the creek. There are also several places where the road shoulder meets the creek bank, and where ditch relief culvert outlets drain directly into the creek. In late January 2015, the snow

and ice cover on FSR 428 began to melt during the unusually warm afternoons. At that time, two straw bales were installed at each of the 19 road drainage points in an effort to prevent sediment-laden runoff from FSR 428 from being able to flow into nearby Ambrose Creek. The unusually warm melt period (afternoon temperatures in the 50's to low 60's) continued into the first week of February 2015. During these warm winter afternoons, water carrying suspended road sediments was observed traveling long distances down FSR 428 within the established wheel ruts. Eventually, the water would exit the road surface, usually on the fill slope side and flow towards Ambrose Creek. Sometimes the water transported minimal sediment, but at several points easily visible trails of sediment were observed being carried into the ditch relief culverts or down the fill slope. There were also locations where the outlets of the ditch relief culverts were observed dumping water and sediment directly into Ambrose Creek. The previously placed straw bales were ineffective at trapping the sediment and preventing it from entering the stream. Their incomplete contact with the ground allowed water and sediment to flow under them without intercepting most of the fine sediment. Some of the outlets of the ditch relief culverts also were located so close to Ambrose Creek that there was no space to effectively trap water and sediment coming out of the outlets.

The Three Saddle EA, Table 2-6: Mitigation Measures and Design Criteria for Alternative 2 of the Three Saddle Project, states: *The timber sale administrator (TSA) and/or resource specialists will monitor road conditions to avoid sediment contributions to streams. Road maintenance activities (including snowplowing and dust abatement) will follow the requirements specified in the U.S. Fish and Wildlife Service's Programmatic Biological Assessment for Road Maintenance (2008) and Bitterroot National Forest Best Management Practices.*

Appendix B in the Three Saddle EA contains the Soil and Water Conservation Practices Worksheet (BMPs), and it lists: *Limiting the Operating Period of Timber Sale Activities (B6.65 B6.6 B6.31 B6.311 B6.312 C6.316# C6.6) - Normal operating seasons will be identified in the timber sale contract. The timber sale administrator will monitor conditions and enforce as needed.*

In response to the accelerated runoff conditions observed on FSR 428, the Forest responded by stopping the log haul until colder temperatures returned and the road surface adequately refroze. Also, timber sale personnel used hand tools in an attempt to divert water off the road surface and spread salt on the road ice to try to melt a path for water to access the insloped ditch.



**Photo 13 – Outlet of FSR 428 Ditch Relief Culvert Carrying Water and Sediment into Ambrose Creek, February 2015**



**Photo 14 – This is the Area where FSR 428 first Comes Close to Ambrose Creek. Estimated to be Milepost 1.2. Several Points Combine to Create the Turbid Water, February 2015**

**Results from Monitoring Sediment Traps along the Ambrose Creek Road (FSR 428), 2010 - 2014**

The Ambrose sediment traps are 4-foot by 8-foot, 6-inch deep boxes that were placed below the outlets of cross-drains along the Ambrose Creek Road (FSR 428). Four traps were installed and monitored between 2010 and 2014 (Figure 2). The intent was to monitor the impact that FSR 428 has on Ambrose Creek's water quality and to

help reduce the amount of sediment that enters fish habitat. Some of the FSR 428 cross drains dump directly into Ambrose Creek and there is no space to place a sediment retention structure. Other cross drains outlet onto a well vegetated area that naturally traps sediment and prevents it from being able to enter Ambrose Creek in most flow situations.

The four traps were checked periodically in 2010-14 and cleaned once or twice per year. Observations in March and sometimes April have shown that the boxes hold ice into the early to mid-spring. FSR 428 is also generally frozen at that time and not transporting much sediment. Observations in late April and May have shown low to moderate amounts of sediment in the traps as the temperature increases and the effects of vehicles increases. During late May and June snow melt, rain and road traffic combine to increase the amount of sediment moving from the road. Thundershowers in summer can also result in intense rain that moves sediment from the road and into the traps. Table 3 summarizes the observations that were made at the sediment traps is 2010-14.

A key note is that the traps only trap sediment when runoff from the road is shunted into the roadside ditch. This is how the road is designed to function. When the road loses the surface shape (i.e. inslope or crown of the road is compromised by wheel ruts) the sediment laden water fails to travel off the road, into the ditch, then the cross drain, and to the sediment trap. This results in low amounts of sediment in the trap and a severe under-estimate of the amount of sediment the road delivers to the stream. Photos and video on file show brown water flowing down wheel ruts, over the road shoulder and into Ambrose Creek.

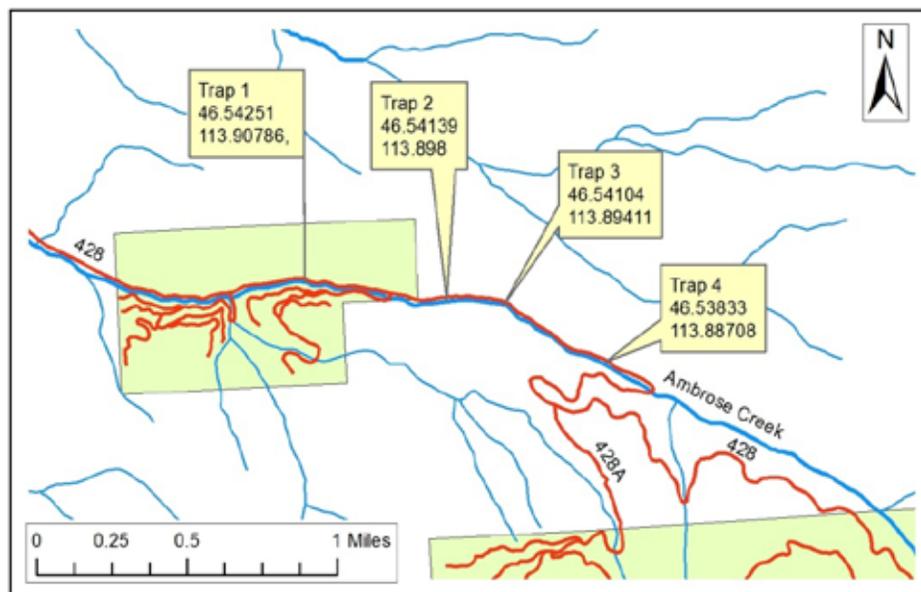


Figure 2 – Location of Sediment Traps along FSR 428, Ambrose Creek Road

Table 3 – Observations from the Ambrose Creek Road (FSR 428) Sediment Trap Monitoring

Date	Gallons of Sediment				Notes
	Trap 1	Trap 2	Trap 3	Trap 4	
8/22/14	2	2	3	4	Sediments were very fine (clay). Road shape in good condition throughout the monitored section. Fines trapped are similar in color to road surface, and dissimilar from the cutbanks. Notched the cross boards in trap 3 to allow long-toed salamanders (~20) to escape. Change in trap may affect future sediment retention.
04/29/14	0.1	0.1	0.1	0.1	Material in the traps was very fine (silt-clay). Although it was a big snow year, the snow at this elevation came off relatively slowly.
06/27/13	2.5	2.5	9	6	Generally good road shape, especially at traps 3 & 4. Some wheel

Date	Gallons of Sediment				Notes
	Trap 1	Trap 2	Trap 3	Trap 4	
					ruts appearing and causing surface run-off to stay on road for extended length and bypass the ditch, especially at traps 1 & 2. Therefore, amount of erosion from the road may be more than the numbers portray, but the amount of material in the trap depends on the shape of the road (a lack of wheel ruts). Wheel ruts upslope of trap 2 were noted to shunt sediment to stream and not to ditch and trap. Material in trap is very fine (clay). Cobble sized rock used in ditch may not be good at slowing water. Small dams may help.
10/17/12	1	0.5	0.1	0.1	Post rain storm and post road reconstruction. Ambrose ditches and culverts functioning. Probably 80% of road sediment traveling into ditch and through cross-drain culverts, and caught by trap. Ditch and culverts as designed. Road reconstruction seems to maintain road drainage w/o producing excess sediment.
<b>Road Reconstruction in Summer 2012</b>					
06/20/12	17.5	15	17	17	Traps surprisingly similar in amount of sediment caught. Mostly fines (silt).
05/30/12	0.1	2	5	2	Ditch and culvert of Trap 1 not catching road runoff. Craig Thomas (Private forester) photo'd #4 on 5/29
08/30/10	0.1	0.1	0.1	0.1	A film of sediment in all traps. Road eroding directly into stream in spots. Crown does not push water to ditch as it should. Cattle use intense resulting in fill slope and streambank erosion
06/24/10	3	4	4	5	Silt hard to remove as traps retaining water too.
05/27/10	0	0	0	0	Traps clean, and have water in them.
08/03/09	0	0	0	0	Traps installed.

**Lost Trail Ski Area Sanitation Salvage Sale (Sula Ranger District):** This 250-acre salvage sale was conducted at the Lost Trail Ski Area during the summers and autumns of 2012 and 2013. The last of the timber harvest and hauling was completed in October, 2013. The prescription was thinning by removing the beetle-killed lodgepole pine. The yarding systems were a mix of tractor and skyline. Both the Montana and Idaho sides of the ski area were thinned. NEPA was covered by a 2012 Decision Memo.

On October 10, 2014, Forest fisheries biologists walked and inspected the RHCAs on the Idaho side of the ski area (units 6b, 10b, 11b, 11c, 13b), a year after these units had been harvested. On the Montana side of the ski area, the RHCAs in units 34, 35a, and 35b were also walked and inspected, two years after harvest. The purpose of the 2014 monitoring was to complete and document compliance with the monitoring requirements in the Endangered Species Act (ESA) Section 7 informal consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. The monitoring requirements in the ESA consultation are listed below in the *italics* font, followed by our 2014 findings in the normal font.

*Implementation Monitoring: A Forest Service fishery biologist and timber sale administrator will monitor the salvage sale activities to ensure that the conservation measures (section 2.2.1 of the biological assessment and evaluation) are properly followed. The fishery biologist will walk all of the RHCA boundaries in the same season that the salvage harvest occurs to see if the vegetation in the RHCAs was properly protected from felling and equipment entry.*

This monitoring requirement was completed on October 24, 2013, and documented in a unit log that was mailed to the consultation biologists at the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. On October 24, 2013, all of the RHCA buffers in the Idaho portion of the project area were walked and inspected. The RHCAs bordered units 6b, 10b, 11b, 11c, and 13b. The salvage harvest had been completed in those units a couple of weeks prior to our monitoring. We found no violations of the conservation measures. The vegetation in the RHCAs was properly protected from felling and equipment entry. The temporary roads and tracked line machine trails that were constructed to access the salvage units were satisfactorily recontoured, seeded, fertilized, and slashed prior to the onset of winter.

Effectiveness Monitoring: A Forest Service Fishery Biologist will re-walk all of the RHCA boundaries in the summer following the salvage harvest to see if the conservation measures were effective in preventing eroded soils from entering the RHCAs.

This monitoring requirement was completed on October 10, 2014 when the RHCAs in the Idaho portion of the project area (units 6b, 10b, 11b, 11c, and 13b) were re-walked and inspected again. There were no indications of eroded soils moving into the RHCAs. There were only small and localized patches of disturbed soils near the RHCA boundaries, mostly caused by skyline yarding a log here and there. Most of the harvested areas near the RHCA boundaries had lots of sticks and limbs on the ground which were functioning as effective ground cover. There were no visible sediment trails and rills originating from the harvest units and the recontoured temporary roads and tracked line machine trails. The grass seed that was planted on the recontoured temporary roads and tracked line machine trails did not produce much growth in its first growing season, but even with the lack of surface vegetation, the soils on the recontoured roads and tracked line machine trails appeared to be stable. Significant rilling was not evident, nor were eroded soils moving off the sites. Our conclusion is that the conservation measures (section 2.2.1 of the biological assessment and evaluation) were effective in preventing eroded soils from entering the RHCAs.

The RHCAs in the Montana portion of the ski area were also walked and inspected on October 10, 2014. These RHCAs bordered units 34, 35a, and 35b. It has been over two years since salvage harvest was completed in the Montana units. Similar to our findings in Idaho, we saw no indications of eroded soils entering the RHCAs, and the conservation measures were effective in preventing eroded soils from entering the RHCAs.

Consistency with mitigation measures: The mitigation measures in the 2012 Decision Memo were satisfactorily followed in the Lost Trail Ski Area Sanitation Salvage sale. The ESA Section 7 informal consultation contained an additional mitigation measure that specified that any temporary roads and tracked line machine trails that would overwinter in Idaho must: (1) be outsloped and water-barred; (2) have slash filter windrows installed at the mouths of all water bars; and (3) be covered with straw mulch before the onset of winter. This special mitigation was not needed because all of the temporary roads and tracked line machine trails in the Idaho portion of the project were constructed and obliterated in the same season (summer/autumn, 2013). None overwintered.

Effects analysis predictions: Two biological assessments and ESA consultations were completed for the Lost Trail Ski Area salvage sale. One was for the Idaho portion of the sale, which had a “may affect, not likely to adversely affect” determination for bull trout and steelhead; the other was for the Montana portion of the sale, which had a “no effect” determination for bull trout. Both biological assessments predicted that there would be no detectable or measurable changes to fish habitat as a result of the salvage sale. The protection of intact RHCAs was expected to maintain pool habitat, water temperatures, woody debris recruitment, and keep sediment delivery to insignificant levels. Our monitoring suggests that these predictions were valid.

**Fales Flat Campground Salvage Sale (West Fork Ranger District):** NEPA for this small salvage sale was covered in the Fales Flat Campground/Trapper Creek Job Corps Decision Memo (July, 2014). The NEPA authorized felling and removal of beetle-killed trees from three units totaling six acres in the USFS Fales Flat Campground. The method of yarding was tractor yarding. The yarding and log hauling was completed in September, 2014. Forest fisheries biologists monitored the completed Fales Flat salvage units on October 31, 2014. The purpose of our monitoring was to monitor the implementation and effectiveness of the mitigation measures in the ESA Section 7 informal consultation. There were two mitigation measures in the ESA consultation, and these are listed below in the *italics* font, followed by our findings in the normal font.

*Mitigation #1: No felling, yarding, or manual thinning would occur within 100 feet of the Nez Perce Fork. This mitigation will ensure that all of the trees in the RHCA that shade the water or could potentially be recruited as instream wood are retained. Previous projects have felled the hazard trees within 100 feet of the Nez Perce Fork, so there is no need for additional felling to occur within 100 feet in this project.*

This mitigation was met. The unit boundaries were marked to stay > 100 feet away from the Nez Perce Fork, and those boundaries were properly followed. There was no felling, yarding, or manual thinning within 100 feet of the Nez Perce Fork. There was some soil disturbance on the skid trails in places, but it was not excessive and because it occurred on flat ground, it poses no sediment risk to the fish habitat in the adjacent Nez Perce Fork. Keeping the salvage units > 100 feet away from the Nez Perce Fork was effective in maintaining all of the streamside shading and the potential for woody debris recruitment.

*Mitigation #2: Slash would not be piled or burned within 100 feet of the Nez Perce Fork.*

This mitigation was met. Slash was piled and burned > 100 feet from the Nez Perce Fork.

Consistency with mitigation measures: The mitigation measures in the ESA section 7 informal consultation were included in the Decision Memo. The mitigation measures were properly followed.

Effects analysis predictions: In the fisheries biological assessment/evaluation for this project, it was predicted that the mitigation measures would adequately protect RHCA shade so that there would be no detectable increases in stream temperatures, no reduction in woody debris recruitment potential, and no sediment delivery to streams. Monitoring indicates that these predictions were valid.

**Trapper Creek Job Corps Center Thinning (Darby Ranger District):** NEPA for this small timber sale was covered in the Fales Flat Campground/Trapper Creek Job Corps Decision Memo (July, 2014). The NEPA authorized commercial thinning of green trees from 21 acres in the Trapper Creek Job Corps Center. The method of yarding was tractor yarding. The yarding and log hauling was completed in January, 2015. Forest fisheries biologists monitored the completed sale on January 23, 2015. The purpose of our monitoring was to monitor the implementation and effectiveness of the mitigation measures in the ESA Section 7 informal consultation. There were two mitigation measures in the ESA consultation, and these are listed below in the *italics* font, followed by our findings in the normal font.

*Mitigation #1: No felling, yarding, or manual thinning would occur within 100 feet of the West Fork Bitterroot River. This mitigation will ensure that all of the trees in the RHCA that shade the water or could potentially be recruited as instream wood are retained. Previous projects have felled the hazard trees within 100 feet of the West Fork, so there is no need for additional felling to occur within 100 feet of the river in this project.*

This mitigation was met. Unit #4 was the only unit in the sale that borders the West Fork Bitterroot River and was applicable to mitigation #1. There was no cutting of trees or yarding within 100 feet of the West Fork. Keeping the units > 100 feet away from the West Fork will maintain all of the shade on the river and the potential for woody debris recruitment.

*Mitigation #2: Slash would not be piled or burned within 100 feet of the West Fork Bitterroot River.*

This mitigation was met. Slash was piled > 100 feet from the West Fork Bitterroot River.

Consistency with mitigation measures: The mitigation measures in the ESA section 7 informal consultation were included in the Decision Memo. The mitigation measures were properly followed.

Effects analysis predictions: In the fisheries biological assessment/evaluation for this project, it was predicted that the mitigation measures would adequately protect RHCA shade so that there would be no detectable increases in river temperatures, no reduction in woody debris recruitment potential, and no sediment delivery to the West Fork Bitterroot River. Monitoring indicates that these predictions were valid.

**West Fork REC Powerline Clearing (West Fork Ranger District):** This small timber sale was authorized under the conditions of REC's Special Use Permit. Green and dead trees were felled and removed within the powerline corridor adjacent to the West Fork Highway on Forest Service lands between Beavertail Creek to the south of Ditch Creek. About six acres were logged from two units. The method of yarding was tractor yarding. The yarding and log hauling was completed in February, 2015. Forest fisheries biologists monitored the completed sale on February 17, 2015. The purpose of our monitoring was to monitor: (1) the location of slash piles in the 300 foot RHCA surrounding Beavertail Creek; (2) the felling and yarding of trees that occurred in the 300 foot RHCA surrounding Beavertail Creek; and (3) road conditions on FSRs 5715 and 361-A. These monitoring items are listed below in the *italics* font, followed by our findings in the normal font.

*Monitoring Item #1: The location of slash piles in the 300 foot RHCA surrounding Beavertail Creek.*

Four slash piles were created in the 300 foot RHCA surrounding Beavertail Creek. One was located on the south side of the FSR 361-A crossing of Beavertail Creek; three were located on the north side of the crossing. The piles were supposed to be built > 100 feet from Beavertail Creek in benign locations that would not affect stream shading or create a potential sediment source. Three of the piles were adequately located, one was too close (about 50 feet from the water's edge) to Beavertail Creek. The pile that was too close to Beavertail Creek was chipped per the directions of the fisheries biologist and sale administrator.

*Monitoring Item #2: Felling and yarding of powerline hazard trees in the 300 foot RHCA surrounding Beavertail Creek.*

About two dozen green trees (mostly a mix of ponderosa pine and Douglas fir) that posed a hazard to the powerlines were authorized for felling and tractor yarding in the 300 foot RHCA surrounding Beavertail Creek. The cutting of trees in RHCAs for safety reasons is allowed by INFISH standard RA-2 which states "Trees may be felled in RHCAs when they pose a safety risk. Keep felled trees on site when needed to meet woody

debris objectives". Most of the hazard tree felling in the RHCA occurred on a dry terrace on the north side of Beavertail Creek between 80' and 200' from the water's edge. A few trees were cut on the south side of the FSR 5715/361-A junction, which is 250 to 300 feet from the water's edge. No trees were cut within the floodplain.

Prior to cutting, the project area was field reviewed by the project fisheries biologist and timber personnel. The trees that were deemed a safety hazard and marked for cutting and removal were verified. Trees that were deemed necessary for potential shade and woody debris recruitment were identified and retained on site. Cutting occurred according to plan. The goal was to preserve as much shade on the floodplain and Beavertail Creek as possible without compromising safety of the powerlines. Where trees were cut on the north side of Beavertail Creek (within 80 to 200 feet from the edge of the stream), there is now a small clearing and a narrow cleared corridor running upstream parallel to Beavertail Creek where a small reduction in RHCA shade has occurred. However, the clearing is probably far enough away from Beavertail Creek itself that it won't result in direct shade losses on the surface of the water.

*Monitoring Item #3: Road conditions on FSRs 5715 and 361-A.*

Haul road conditions were satisfactory. There was not any significant rutting of the road surfaces, but the surface of FSR 361-A was soft where it crosses Beavertail Creek. As mitigation, a slash filter windrow was constructed around the road crossing to trap any road sediment potentially moving towards Beavertail Creek. The windrow turned out to be an effective mitigation. It prevented road sediment from being able to enter the stream.

Effects analysis predictions: In the fisheries biological assessment/evaluation, it was predicted that project activities would have "no effect" on bull trout and bull trout critical habitat in the West Fork Bitterroot River. For westslope cutthroat trout in Beavertail Creek, the determination was "may affect individuals and habitat, but not lead to losses of viability or federal listing". The monitoring results indicate that these determinations were valid.

**Hughes Creek Fuel Wood Timber Sale (West Fork Ranger District):** NEPA for this firewood sale was covered in the Hughes Creek Fuel Wood Sale Decision Memo (December, 2014). The NEPA authorized felling and removal of dead and dying trees (primarily beetle-killed lodgepole pine) from five units totaling 67 acres. Most of the harvest occurred in the Hughes Creek drainage; one unit (unit 6) was harvested along the West Fork Bitterroot River near the Rombo gravel pit. The method of yarding was tractor yarding. The yarding and log hauling was completed in October, 2015. Forest fisheries biologists monitored the completed sale on November 3, 2015. The purpose of our monitoring was to monitor the implementation and effectiveness of the mitigation measures in the ESA Section 7 informal consultation. There were four mitigation measures in the ESA consultation, and these are listed below in the *italics* font, followed by our findings in the normal font.

*Mitigation #1: Log hauling shall occur only when roads are adequately dry. Hauling will immediately cease during periods and conditions are wet enough to produce rutting of the road prism, rilling of water, and movement of fines along the road. The Timber Contract Administrator will be responsible for determining when conditions are too wet for haul and this individual will have the authority to suspend hauling as conditions warrant.*

This mitigation was met. The haul roads for this sale were the Hughes Creek Road (graveled) and the West Fork Highway (paved). Hauling occurred during mostly dry and dusty times of the year. The Hughes Creek Road held up fine to the generally light log truck traffic that it received. We saw no road damage and/or creation of potential road sediment sources or delivery rills. Sediment inputs to Hughes Creek were either negligible (invisible) or non-existent, which is consistent with the effects analysis in the BA/BE.

*Mitigation #2: Roads will be protected from unwarranted damage during haul operations. Road conditions will be monitored by the Timber Contract Administrator and/or resource specialists to ensure conditions do not deteriorate to the point where sediment could potentially enter live water. The Timber Contract Administrator will be responsible for and have the authority to ensure that road integrity is maintained during log haul operations.*

This mitigation was met. The log haul was managed well. The Hughes Creek Road held up fine to the generally light log truck traffic that it received. We saw no road damage and/or creation of potential road sediment sources or delivery rills. Sediment inputs to Hughes Creek were either negligible (invisible) or non-existent, which is consistent with the effects analysis in the BA/BE.

*Mitigation #3: Riparian Habitat Conservation Areas (RHCA's) will be designated and marked on the ground within all commercial harvest units in consultation with a Forest Service Fisheries Biologist. Commercial*

*harvest of timber and incursion with motorized equipment within a designated RHCA is not allowed. If and when trees felled outside of the RHCAs land or roll into the RHCAs, their boles may be removed, but their tops and limbs will be left behind in the RHCAs. When there is an identified threat to life and/or property, trees within a designated RHCA can be felled to mitigate the hazard. Trees felled within RHCAs for safety reasons will not be removed and must be left on site. In circumstances where trees felled within RHCAs block a road or trail, only that portion of the tree blocking the road or trail will be bucked up and rolled/thrown into the nearby RHCA. The remaining portion of the tree that does not block the road or trail will be retained within the RHCA.*

This mitigation was not entirely met. Four units in this sale contained RHCAs: 3, 4, 6, and 8. Mitigation #3 was met in units 3, 4, and 8, but was not met in a small portion of unit 6 because of an incorrect marking of the 300 foot RHCA surrounding the West Fork Bitterroot River. The incorrect marking occurred near in the northern portion of unit 6 at GPS N 45.75511° W 114.28816°. At that location, there is a large side channel to the West Fork Bitterroot River that makes a sharp oxbow meander towards the east. North of the Rombo gravel pit, the 300 foot RHCA boundary follows the edge of a prominent dry terrace that borders the river's floodplain. Apparently, the marking crew missed the side channel and continued to locate the RHCA along the edge of the terrace when they should have moved the RHCA boundary about 150 feet towards the east adjacent to the oxbow side channel. As a result, about 200 lineal feet of the RHCA boundary was only 130 feet from the river side channel instead of the 300 feet it should have been. Because of this error, the main skid trail that runs along the west side of unit 6 ran through the outer half of the 300 foot RHCA for a distance of about 200 feet. The Decision Memo stated that incursion of motorized equipment would not be allowed within a designated RHCA. The actual effect to the fishery from this incursion of motorized equipment into the RHCA was "no effect" because the skid trail was located on flat ground with no potential to contribute sediment to the river, and its location has no effect on the Riparian Management Objectives (pools, large wood, shade, water temperature, channel dimensions).

*Mitigation #4: The following (default) Inland Native Fish Strategy (INFISH) buffer widths will be applied as follows: Unit 3, east side – Meadow Gulch, 100 foot RHCA; Unit 3, west side – Meadow Gulch, 100 foot RHCA; Unit 4, southeast side – Taylor Creek, 100 foot RHCA; Unit 6, west side – West Fork Bitterroot River, 300 foot RHCA; and Unit 8, northwest side – Taylor Creek.*

This mitigation was not entirely met. The RHCAs in units 3, 4, and 8 were correctly delineated and marked around Meadow Gulch and Taylor Creek. The majority of the 300 foot RHCA along the west side of unit 6 was correctly marked with the exception of the small area described in the paragraph above. As a result of that incorrect marking, about 3/4th of an acre of the 300 foot RHCA surrounding the West Fork Bitterroot River was commercially thinned, primarily beetle-killed small diameter ponderosa pine trees were removed. The area thinned was not functional riparian area – it was a dry pine terrace that happened to lie within 300 feet of the side channel to the river. There will be no effect to the Riparian Management Objectives as a result of the incorrect RHCA marking and associated harvest.

Consistency with mitigation measures: The mitigation measures in the ESA section 7 informal consultation were met with the exception of the RHCA marking error in unit 6 adjacent to the West Fork Bitterroot River.

Effects analysis predictions: In the fisheries biological assessment/evaluation for this project, it was predicted that the mitigation measures would ensure a "may affect, not likely to adversely affect" determination for bull trout and bull trout critical habitat. Monitoring indicates that this determination was valid.

**Burned Area Recovery Project (All Districts):** At the start of 2016, the only work that remains in the Burned Area Recovery (BAR) project is:

- 11 miles of road storage
- 56.5 miles of road BMP upgrades
- Replacement or removal of two fish culverts (Rye Creek, Road 5612 and North Rye Creek, Road 8111)

Table 4 summarizes the status of the various projects in the Burned Area Recovery settlement agreement (February 7, 2002) at the start of 2016.

**Table 4 - Status of Activities in the February 7, 2002 Burned Area Recovery Settlement Agreement**

<b>Work Category</b>	<b>Settlement Agreement Specifics</b>	<b>FY 15 Accomps</b>	<b>Accomplished to Date 01-01-2016</b>	<b>Percent Accomplished</b>
Road BMP Upgrades	513 miles	1.5 miles	456.8 miles complete  16.4 miles partially complete	89% complete (still have 56.5 miles to upgrade)  3% partially complete
Road Decommissioning	46 miles	completed in 2009	46 miles	100%
Road Storage	105 miles	none	94 miles	90% (still have 11 miles to store)
Fish Passage Culvert Replacement	32 culverts	none	22 culverts replaced  1 culvert removed  2 bridges installed  5 culverts dropped from consideration	94% (still have 2 culverts to replace or remove)
Fish Habitat Improvement	16 miles of stream	completed in 2005	16 miles	100%
Reforestation (planting)	33,150 acres	completed in 2011	16,829 acres	51% of settlement agreement acreage was planted; there are no plans to plant more
Fuel Reduction Salvage Harvest	14,700 acres	completed in 2007	11,827 acres under contract  11,785 acres harvested  187,939 tons removed  27.39 MMBF removed	80% of settlement agreement acreage was harvested; there are no plans to harvest more
Riparian Planting	4.5 miles of stream riparian habitat	completed in 2003	4.5 miles	100%

All Burned Area Recovery salvage sales are closed. Harvest figures include acreage and volume associated with subsequent NEPA decisions related to Douglas-fir mortality within some BAR sales.

There are three fisheries monitoring items in the Burned Area Recovery FEIS (Volume II, Appendix C, pages C-12 to C-16). Forest fisheries biologists started monitoring these items in February 2002, and they have been monitored and reported every year since. Monitoring of items #1 and #3 was completed in 2007 when the last of the Burned Area Recovery salvage sales closed. The results for items #1 and #3 were reported in our 2007

Forest Plan Monitoring Report, and will not be reiterated in this report. We only report the results of item #2 in this report. Monitoring of item #2 will continue until all of the Burned Area Recovery culvert replacements and road storage is completed. The objectives of item #2 are to:

- ensure that Best Management Practices (BMPs) are properly applied to minimize sediment production during the replacement of fish culverts and the decommissioning and storage of roads
- ensure that the Forest meets management obligations for threatened, endangered, and sensitive fish species
- ensure that culvert replacement and watershed improvement activities comply with the Forest Plan as amended by INFISH
- ensure that state water quality standards are being met

In order to meet the objectives of item #2, we focused our monitoring efforts to answer two questions.

1. Were BMPs properly applied to minimize sediment production during the replacement of fish culverts and the decommissioning and storage of roads?

YES. The only BAR implementation activity that occurred in 2015 was completing 1.5 miles of BMP upgrades on Road 5609 in the Rye Creek drainage. The treatment on Road 5609 was to place the road into long-term storage. BMPs were properly applied during the storage of Road 5609 to minimize sediment production. No BAR implementation activities occurred in 2014. No replacement or removal of BAR fish culverts occurred in 2014 and 2015.

Since implementation of the BAR project began in 2002, the Bitterroot NF has decommissioned 46 miles of road and placed 94 miles of road into long-term storage. A subset of this work is being annually monitored by Forest hydrologists and fisheries biologists. Implementation monitoring occurs while the decommissioning and storage is being conducted to assess BMP compliance. Effectiveness monitoring occurs in the years following the completion of the decommissioning and storage to track long-term vegetative recovery and sediment delivery potential. In 2014 and 2015, effectiveness monitoring occurred on the following roads that were decommissioned or stored in previous years:

- Road 13833 in the Elk Creek drainage, West Fork Ranger District. This road was stored in 2010, and two fish culvert barriers on Elk Creek were removed.
- The Road 7367x and 7368x system in the Gilbert Creek drainage, Sula Ranger District. This road system was decommissioned in 2008.
- Road 73213 in the Medicine Tree Creek drainage, Sula Ranger District. This road was decommissioned in 2006-07.

Unit logs and power point files that document our monitoring findings for these projects are available in electronic or hard copy format upon request from the Bitterroot National Forest Supervisor's Office.

There have not been any completed BAR road treatments where BMPs were found to be improperly applied. The majority of the decommissioning and storage treatments have not involved many live stream crossings. Where culverts have been removed on live streams, sediment mitigation BMPs (clean water diversion, use of straw bale check dams, seeding and mulching disturbed soils, etc.) were properly applied. Erosion and sediment effects have been within the bounds analyzed and described in the BAR FEIS and bull trout biological assessment effects analyses. So far, we have observed no significant sediment and erosion problems or BMP application concerns during the road decommissioning or road storage activities. Project mitigation measures and ESA terms and conditions have adequately protected threatened (bull trout) and sensitive (westslope cutthroat trout) fish species from short-term sediment effects.

37 fish culverts were analyzed for replacement or removal in the BAR FEIS and included in the Record of Decision. Five of the 37 were dropped from the BAR settlement agreement because they had already been implemented during the Burned Area Emergency Rehabilitation effort (North Rye Creek, Road 321 upper crossing, Section 31), or had jurisdiction conflicts that could not be resolved (North Rye Creek unnamed tributary 4.3, Road 62435; Taylor Creek, County Road 104-A; Mill Gulch, County Road 104-A; Malloy Gulch, County Road 104-A). That left 32 fish culverts that were included in the BAR settlement agreement. Of those 32 fish culverts, 25 have been replaced or removed and 5 have been dropped from treatment, leaving two (Rye Creek, Road 5612 and North Rye Creek, Road 8111) still to be replaced or removed. The Road 8111 culvert is likely to be proposed for replacement or removal in Phase II of the Darby Lumber Lands project.

All of the culvert replacements and removals that have been completed were monitored by Forest fisheries biologists during implementation. Since then, most of the culverts are being monitored at least annually at a variety of flow levels. Our monitoring indicates that BMPs were properly applied during implementation, and short-term sediment effects have been within the bounds described in the BAR FEIS and bull trout biological assessment effects analyses. The long-term benefits gained from reconnected habitat and reduced population fragmentation has far outweighed the short-term negative effects of increased sediment deposition near the sites.

The 25 fish culverts that have been replaced or removed are:

1. Daly Creek tributary 5.1 (removal), Road 5783. August, 2001
2. Sand Creek, Road 362. July, 2003
3. Magpie Creek, Road 362. July, 2003
4. Took Creek, Road 362. July, 2003
5. Took Creek, Road 1303. July, 2003
6. Bugle Creek, Road 725. October, 2003
7. Crazy Creek, Road 370-A. October, 2003
8. West Fork Camp Creek, Road 729. October, 2003
9. West Fork Camp, unnamed tributary 0.9, Road 8112. October, 2003
10. West Fork Camp, unnamed tributary 1.0, Road 8112. October, 2003
11. Railroad Creek, Road 75, August 2005
12. Hog Trough Creek, Road 75, August 2005
13. Weasel Creek, Road 75, August 2005
14. Rye Creek, unnamed tributary 12.3, Road 75, September 2005
15. Rye Creek, unnamed tributary 12.3, Road 5607, September 2005
16. North Rye Creek, Road 321, August 2006
17. Moose Creek (new bridge), Road 726, August 2007
18. Coal Creek, Road 5662, September 2007
19. Hart Creek, Road 311, September 2008
20. Hart Creek, Road 73180, September 2008
21. Mink Creek, Road 5753, September 2008
22. Castle Creek, Road 49, October 2008
23. East Piquett Creek, Road 731, May 2009
24. Two Bear Creek (new bridge), County Road 85D, April 2010
25. Mine Creek, Road 5688, May 2010

The 5 fish culverts that have been dropped from treatment in the BAR settlement agreement are:

1. Daly Creek, unnamed tributary 3.2, State Highway 38: Dropped in 2003 because the culvert is under the jurisdiction of the Montana Department of Transportation.
2. Bugle Creek, Road 73609: Dropped in 2003 because surveys indicate that no fish are present above or below the culvert, and suitable fish habitat is not present due to high gradients.
3. Elk Creek, Road 13860: Dropped in 2006 because surveys indicate that no fish are present above or below the culvert, and suitable habitat is not present due to high gradients.
4. Spring Gulch, Road 75: Dropped in 2009 due to the stream drying up at base flows.

5. Waugh Creek, Road 13334: Dropped in 2010 because of conflicts with a legal water right diversion located right at the mouth of the culvert outlet and the small amount of suitable habitat (300 feet) that is present on Forest Service land below the culvert before the stream is dewatered on private land.

Question #2. Were Forest Plan and State water quality standards met during the replacement of fish culverts and the decommissioning and storage of roads?

YES. State water quality standards have been met through the proper application of BMPs. The use of BMPs minimized short-term sediment production to the extent possible given the nature of the work. Forest Plan standards have been met by implementing the road storage and decommissioning treatments in a manner that promotes the long-term health of watersheds (INFISH standard WR-1), by sizing the new culverts, bottomless arches, and bridges to pass the 100-year flood event (INFISH standard RF-4), and by installing the new structures in a stream simulation manner to provide and maintain fish passage (INFISH standard RF-5).

The Forest annually sends a Burned Area Recovery Fish Monitoring Report and Terms and Condition letter to the U.S. Fish and Wildlife Service which documents our progress in meeting the terms and conditions in the Burned Area Recovery Biological Opinion. The 2014 and 2015 Burned Area Recovery Fish Monitoring Reports and the Terms and Condition letters are available in electronic or hard copy format upon request from the Bitterroot National Forest Supervisor's Office.

**Our Key Findings**

- BMPs have been properly applied during culvert replacement, road decommissioning, and road storage activities. The application of BMPs has been consistent with meeting State water quality standards.
- Culvert replacement, road decommissioning, and road storage treatments have complied with the Forest Plan as amended by INFISH.
- Sediment contributions from the road decommissioning and storage treatments have been minimal. Few direct impacts on fish habitat have been observed. Where impacts have occurred, they have been temporary and localized to the immediate road crossing area where culverts have been removed and stream drainages recontoured.
- Sediment contributions during the culvert replacements have been consistent with the effects analysis in the Burned Area Recovery FEIS. Water quality has been protected by mitigation to the extent possible given that short-term sediment inputs are unavoidable while replacing culverts.