Pataha Creek Model Watershed

Habitat Conservation Projects

Annual Report
1998

DOE/BP-14994-1

December 1999

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PATAHA CREEK MODEL WATERSHED

1998 Habitat Conservation Projects

Cooperators:
Bonneville Power Administration
Washington State Conservation Commission
Washington State Department of Fish and Wildlife
Natural Resource Conservation Service
Umatilla National Forest, Pomeroy Ranger District
Farmers and Ranchers of the Pataha Watershed

December 1999

1998 Habitat Projects Completed

Completion Report – December 1999

Project # 97-47-MW	BPA through Conservation Commission
Project # 99-21	Purchase Order # 99AP14994
Project # 97-88	Purchase Order # 97AP37117
Project #96-066-00	Purchase Order # 96AP96728

Prepared for:

U.S. Department of Energy
Bonneville Power Administration
Environment, Fish and Wildlife Division

Washington State Conservation Commission

Washington Department of Fish and Wildlife

Umatilla National Forest, Pomeroy Ranger District

Natural Resources Conservation Service

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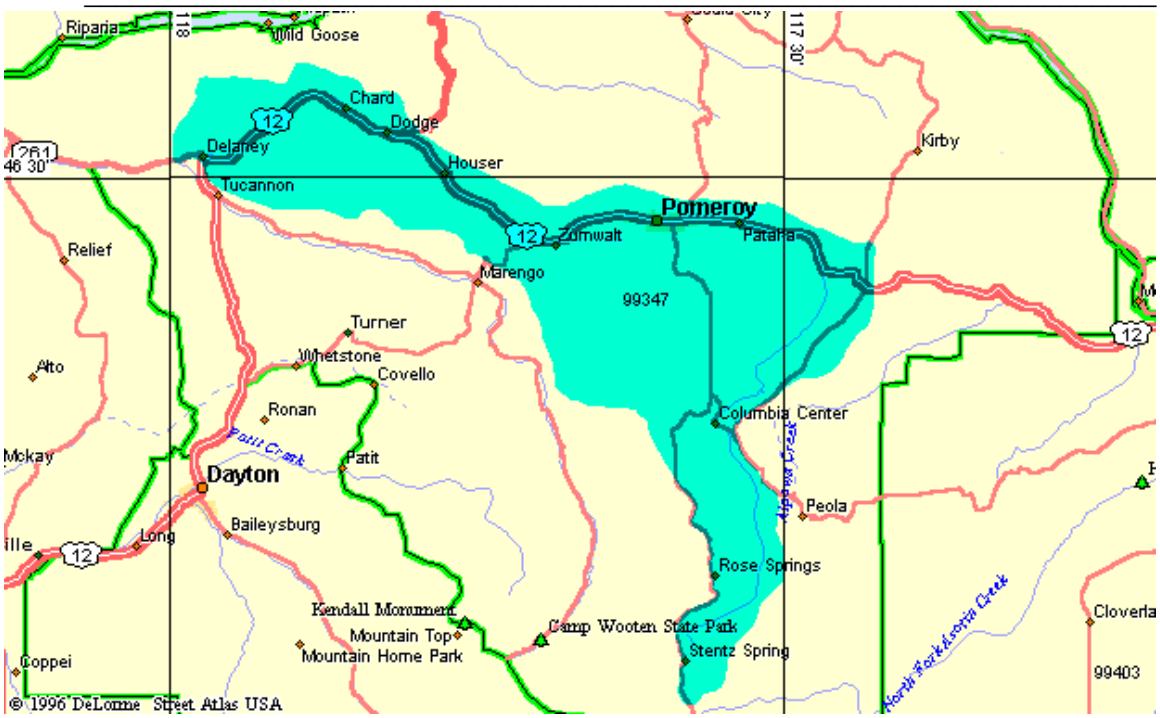

Pataha Creek Watershed

Located in Garfield County in SE Washington

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Abstract

The projects outlined in detail on the attached project reports are a few of the many projects implemented in the Pataha Creek Model Watershed since it was selected as a model in 1993. Up until this year, demonstration sites using riparian fencing, off site watering facilities, tree and shrub plantings and upland conservation practices were used for information and education and was the main focus of the implementation phase of the watershed plan. These practices are the main focus of the watershed plan to reduce the majority of the sediment entering the stream. However, the watershed stream evaluation team used in the watershed analysis determined that there were problems along the Pataha Creek that needed to be addressed that would add further protection to the banks and therefore a further reduction of sedimentation into the stream.

1998 was a year where a focused effort was made to work on the upland conservation practices to reduce the sedimentation into Pataha Creek.
Over 95% of the sediment entering the stream can be tied directly to the upland and riparian areas of the watershed. In stream work was not addressed this year because of the costs associated with these projects and the low impact of the sediment issue concerning Pataha Creeks impact on Chinook Salmon in the Tucannon River. re.

The Pataha Creek has Steelhead in the upper reaches and native and planted rainbow in the mid to upper portion. Suckers, pikeminow and shiners inhabit the lower portion because of the higher water temperatures and lack of vegetation. The improvement of riparian habitat will improve habitat for the desired fish species. The lower portion of the Pataha Creek could eventually develop into spawning and rearing habitat for Chinook Salmon if some migration barriers are removed and habitat is restored.

The upland projects completed during 1998 were practices that reduce erosion from the cropland. Three-year continuous no-till projects are on schedule and the monitoring of this particular practice is ongoing. It's direct impact on soil erosion along with the economical aspects are being studied. Other practices such as terrace, waterway, sediment basin construction and the installation of strip systems is also taking place.

1998 was a very productive year for the Pataha Creek Model Watershed. All the upland practices that were implemented have helped to reduce erosion from the cropland. This has resulted in a reduction of sedimentation into the spawning and rearing area of the Fall Chinook salmon located in the lower portion of the Tucannon River. The tree planting projects have helped in reducing sedimentation and have also improved the riparian zone of desired locations inside the Pataha Creek Watershed.

Forward

Due to the high value of the fish resource in the Tucannon River, there have been many studies and planning efforts directed at restoring resource conditions in this watershed. Pataha Creek, as the largest sub-watershed in the Tucannon watershed has been identified as one of the primary contributors of sediment to the Tucannon River.

One of these studies was conducted by Frank Reckendorf and Mike VanLiew. They conducted a study from September 1985 to April 1986 to determine sediment intrusion into artificial redds in the Tucannon Watershed. Under this study, the textural composition of artificial redds was monitored over a 6 month period to determine sediment intrusion into salmonid spawning beds. The artificial redds were constructed in September 1985, at four sites on the Tucannon River in Southeast Washington. Freeze-core samples were then collected 4 times, from October 1985 to April 1986. The data indicated a marked increase in the percentage of fines and sand sized material present in the redds due to sediment intrusion from winter runoff on the Tucannon River. The apparent decrease in both pore size and relative permeability of the artificial redds due to sediment intrusion reflects a potential decrease in the survival-to-emergence of salmonid.

Under this study the affects of fine sediment and organic matter on salmonid reproduction have been studied intensively for more than three decades, both in situ and in the laboratory (Everest et al, 1987). Sands, silts, clays and organic matter that are deposited in gravel spawning beds -- referred to a redds -- adversely affect the survival to emergence of salmonid populations. Clogging of gravel beds by fine sediments and organic matter reduce the availability of dissolved oxygen needed by salmonid embryos and fry. Fine sediments that are deposited in gravel beds also restrict metabolic wastes produced by incubating salmonid eggs (Alonso et al, 1988). Moreover, fine sediments that clog the interstices of gravel spawning beds entrap the fry within the gravel as they try to emerge.

The following list are publications used in the preparation of the Pataha Creek Model Watershed Plan and also in parts of this proposal.

Sampling of Sediment Intrusion into Artificial Redds in the Tucannon Watershed (Reckendorf & VanLiew, 1989: This was a study completed under the authority of the Soil Conservation Service to determine the affect of sedimentation on artificial redds at four sites in the Tucannon Watershed.

Tucannon River Watershed Plan (USDA 1991): This plan was prepared under authority of PL-566 and recommends certain conservation practices that would

lower water temperature and reduce the amount of sediment delivered to the stream. This plan provides federal cost-share funds to private landowners to help establish the recommended practices. Instream habitat improvement, however, was not included as part of the planning or funding of this project.

Sediment Transport, Water Quality and Changing Bed Conditions, Tucannon River, Washington (Hecht et al. 1982): This plan identified and discussed the effects of land use and other watershed influences on the water quality and fish habitat of the river. It also discussed the effects of reduced water quality on the aquatic populations within the stream.

Ecological Investigations on the Tucannon River, Washington (Kelley and Associates 1982): This study is the second part of the 1981 USDA report listed above, and includes the related biological investigations for the report.

Southeast Washington Cooperative River Basin Study (USDA 1984): The objective of this study was to provide a basin-wide evaluation of existing land management and stream habitat conditions related to erosion and sediment problems.

Tucannon Basin Final Report - Assessment of Ongoing Management Activities (USDA Forest Service 1993): This report analyzes the potential impacts of forest activities, within the Umatilla National Forest, on Chinook salmon in the Tucannon River.

1998 Pataha Creek Model Watershed Projects
Budget Summary

BPA Contract #	BPA Project Name	Total Cost	BPA Funding	Cost Share	Percentage of total cost
97AP37117	Deep Fall Subsoiling	$22,600	$11,300	$11,300	10
97AP37117	No-till seeding	$50,744	$25,372	$25,372	23
97AP37117	Two Pass seeding	$15,900	$7,950	$7,950	7
97AP37117	Critical Area Seeding	$1,264	$632	$632	1
97AP37117	Sediment Basins	$8,444	$6,333	$2,111	4
97AP37117	Divided Slope	$1,812	$906	$906	1
97AP37117	Upland Fencing	$6,984	$3,492	$3,492	3
97AP37117	Riparian Fencing	$12,667	$9,500	$3,167	6
97AP37117	Upland Buffer	$10,000	$5,000	$5,000	5
97AP37117	Riparian Buffer	$2,447	$1,835	$612	1
97AP37117	Grasses in rotation	$2,418	$1,209	$1,209	1
97AP37117	Grassed Waterways	$3,184	$1,592	$1,592	1
97AP37117	Pipeline	$2,824	$1,412	$1,412	1
97AP37117	Streambank Protection	$2,047	$2,047	0	1
97AP37117	Terrace Construction	$6,131	$4,598	$1,533	3
97AP37117	Riparian Tree Planting	$4,104	$2,052	$2,052	2
96AP96128	Off-Site Watering	$18,612	$9,306	$9,306	8
97-47-MW 99AP14994	Administration	$48,165	$48,165	0	22
	Totals	$220,047	$142,701	$77,646	
		100%	64%	36%	

Project: Watershed Project Coordination and Administration for FY98 using contracts 97-47-MW and 99AP14994

The Pomeroy Conservation District was provided a grant from the Bonneville Power Administration (BPA) and the Washington State Conservation Commission for the purpose of funding the administration of the implementation of the Pataha Creek Model Watershed Plan. This plan was a pilot effort to encourage private landowners to join government agencies in finding solutions to loss of salmon habitat and critical riparian area. The goal of the plan was to set into motion efforts to return the upper Pataha Creek Watershed and lower Tucannon River to productive capacity for salmon spawning and rearing.

The Pataha's high delivery of sediment and high water temperatures into the spawning and rearing area of the lower Tucannon River was determined to be the main problem in the Pataha Creek Watershed.

The conservation district hired a watershed coordinator to bring together the technical experts of state and federal agencies with private landowners to jointly find solutions to habitat problems within the watershed. The technical representatives provide the scientific background and information on the critical needs of the fish while the landowners provide the common sense backstop to ensure that the action items suggested by the agencies are attainable, physically and financially within the watershed.

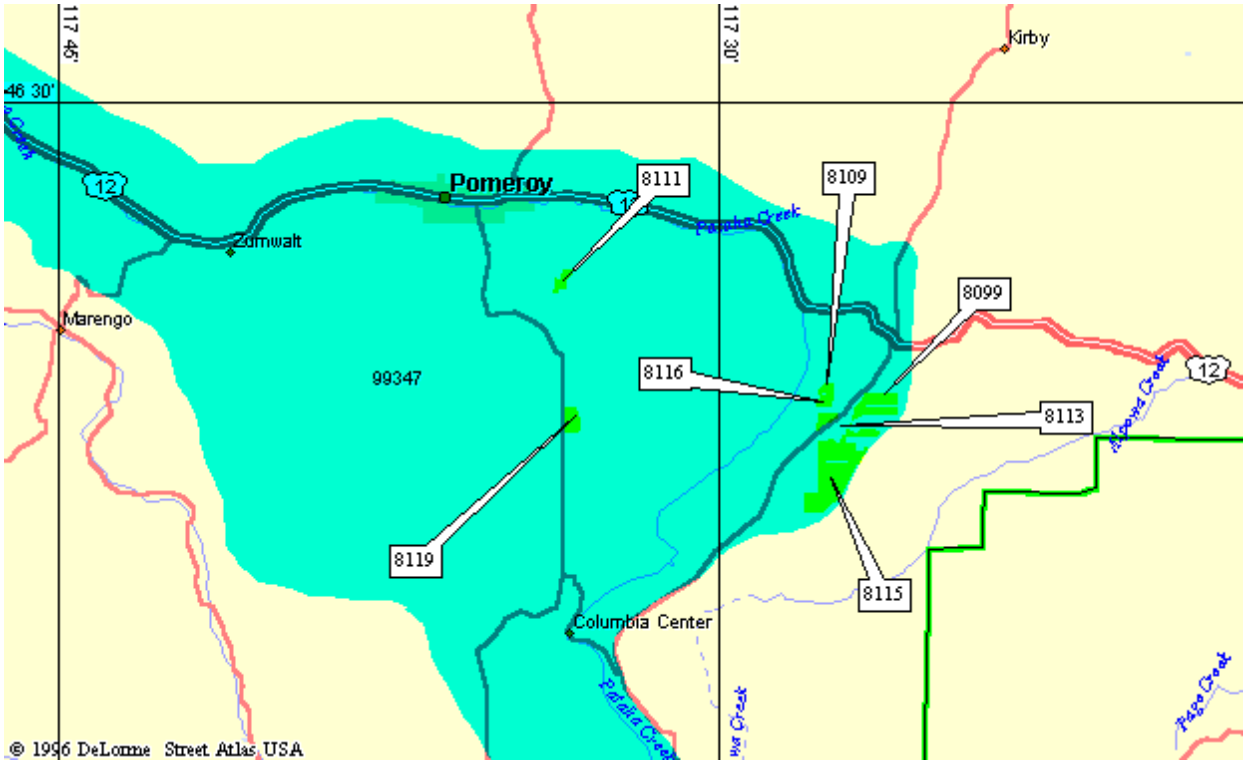
The Pomeroy Conservation District has worked with the Washington State Conservation Commission, Bonneville Power Administration, and the Natural Resource Conservation Service since the beginning of this pilot program. We have jointly implemented conservation practices to help reduce the erosion and resulting sedimentation moving from our uplands into the Tucannon River. We have also installed practices within the riparian area to improve bank stability, riparian vegetation and in-stream fish habitat.

These grants (97-47-MW) and (98AP14994) were used for salaries and benefits for the coordinator and administrative assistant, travel expenses, and goods and services needed for the administration of these implementation grants.

The following summary reflects those expenses:

Salaries		
Coordinator	$17,932	
Clerical	$ 7,053	
Contract mod.	$ 5,000	
Total		$29,985
Benefits		
Employment Sec.	$ 125	
Labor & Industry	$ 135	
Medicare	$ 362	
Soc. Sec.	$ 1,549	
Med. Insurance	$ 8,089	
Retirement	$ 2,349	
Total		$12,609
Goods and Services		
Cellphone	$ 156	
Communications	$ 102	
Information Edu.	$ 375	
Internet Service	$ 165	
Office Supplies	$ 418	
Postage	$ 78	
Printing & Reprod.	$ 186	
Support of existing Proj.	$ 439	
Weather Stations	$ 1,450	
Total		$ 3,371
Travel		
Annual Meeting	$ 1,825	
Regional Seminar	$ 268	
Total		$ 2,093
Total Coordinator expenses		**$48,165**

Project: Deep Fall Subsoiling in Pataha Creek Watershed
BPA Contract #97AP37117



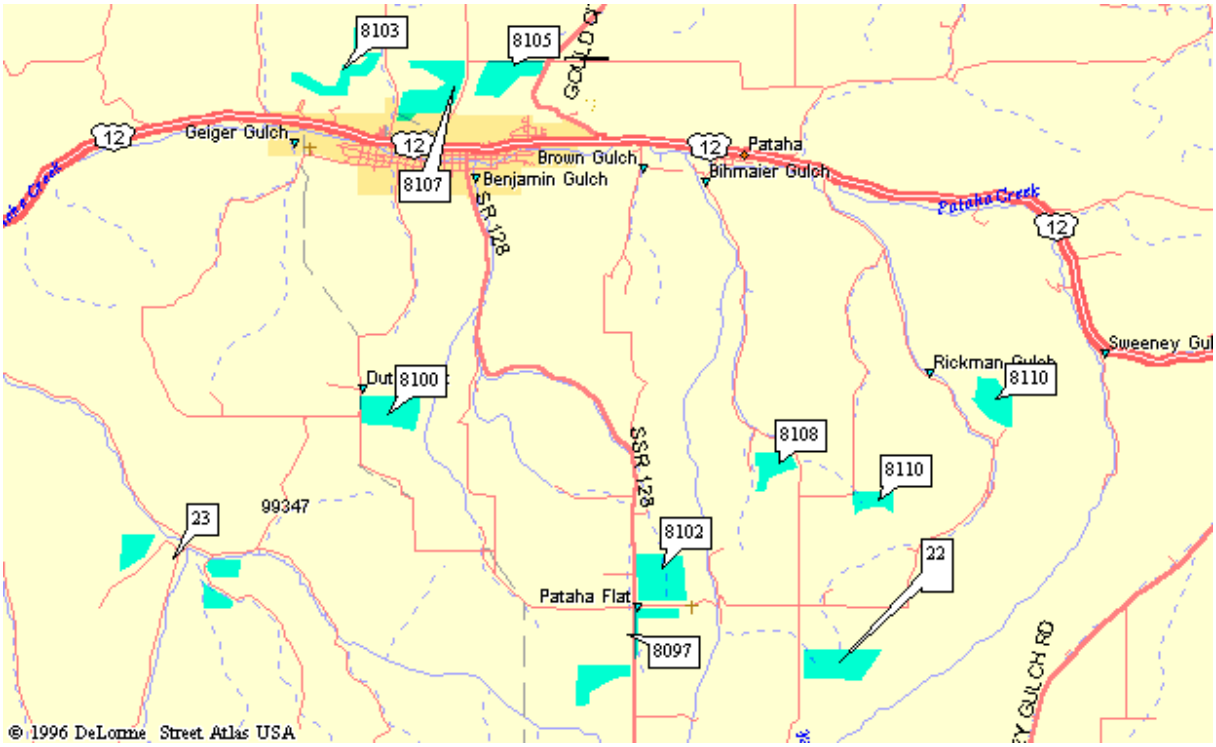
Subsoiling completed in Pataha WS FY 98

CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
8099	Pataha Creek Farms	$1,350	$1,350	135	810
8109	Scott Davis	$ 550	$ 550	55	220
8111	Scott Davis	$ 690	$ 690	69	276
8113	Glen Davis	$3,382	$3,382	338.2	1,353
8115	Flerchinger Ranches	$3,531	$3,531	353.1	1,412
8116	Scott Davis	$ 920	$ 920	92	368
8119	Anna Marie Ledgerwood	$ 877	$ 877	87.7	351
Total		$11,300	$11,300	1,130	4,790 tons


R& R Subsoiler

The practice of subsoiling (Figure 1)breaks up the hardpan layer which develops over a long period of cultivation. This layer develops from 6 to 12 inches below the surface and restricts the infiltration of water that will eventually cause severe erosion on cropland.

Project: No-till seeding in Pataha Creek Watershed
BPA Contract #97AP37117



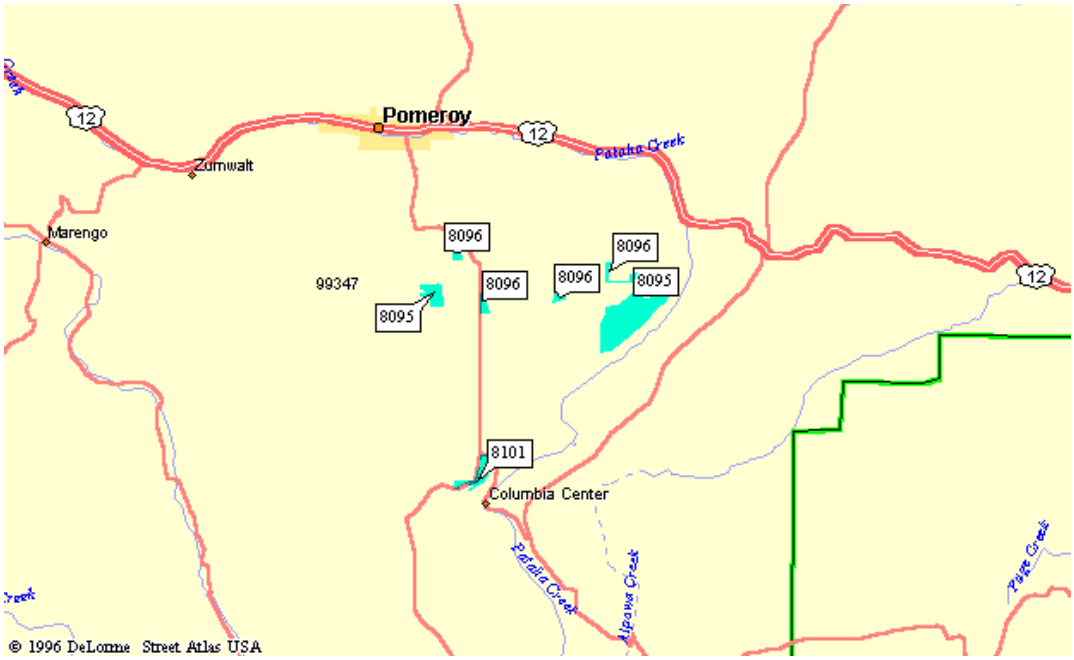
No-till seeding in Pataha WS 1998

CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
11	Gary Houser	$2,880	$2,880	128	1280
12	Bartels Family Farm	$3,478	$3,478	154.6	1546
22	Williams Bros.	$2,385	$2,385	106.2	848
23	Slayco	$1,996	$1,996	88.7	798
8097	Shawley Family Lt.	$1,725	$1,725	115	230
8100	Ledgerwood Farms	$3,725	$3,725	248.3	497
8102	Anna Marie Ledgerwood	$1,116	$1,116	74.4	149
8103	Herres Land Co.	$1,668	$1,668	111.2	556
8105	Tom Herres	$1,674	$1,674	111.6	223
8107	Steve & Chris Wolf	$2,085	$2,085	139	417
8108	Wynn Stallcop	$ 706	$ 706	47.1	94
8110	Gary Houser	$1,933	$1,933	128.9	516
	Totals	$25,372	$25,372	1,453	7,154

Figure 1 Great Plains No-till Drill

This drill (Figure 2) and others similar to this are used to no-till grain crops into soil that has remained undisturbed since the last crop. The drills are capable of preparing a seed bed, placing fertilizer and seeding in one operation. The advantage of this seeding system is the overall reduction in soil erosion and the improvement of soil health. When soil is not cultivated as it has been in the past, a much lower amount of carbon dioxide is released into the atmosphere. The soil is not left exposed to the elements and will not erode from the crop fields into nearby streams. No-till or direct seeding in conjunction with annual cropping and crop rotations is one of the very best ways to reduce upland erosion and the resulting sedimentation into our fish bearing streams.

Project: Two Pass seeding in Pataha Creek Watershed
BPA Contract #97AP37117



Two pass seeding in Pataha Creek WS 1998

CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
8095	C&S Farm	$5,000	$5,000	500	4,510
8096	David Dixon Est.	$1,930	$1,830	183	1,098
8101	Kenton Leonard	$1,120	$1,120	112	1,344
	Total	$7,950	$7,950	795	6,952

Figure 2 Straw Boss fertilizer applicator

The two pass system is very similar to no-till/direct seeding. The difference is that under a two pass system, the fertilizer is applied in a separate operation from the seeding of the crop.

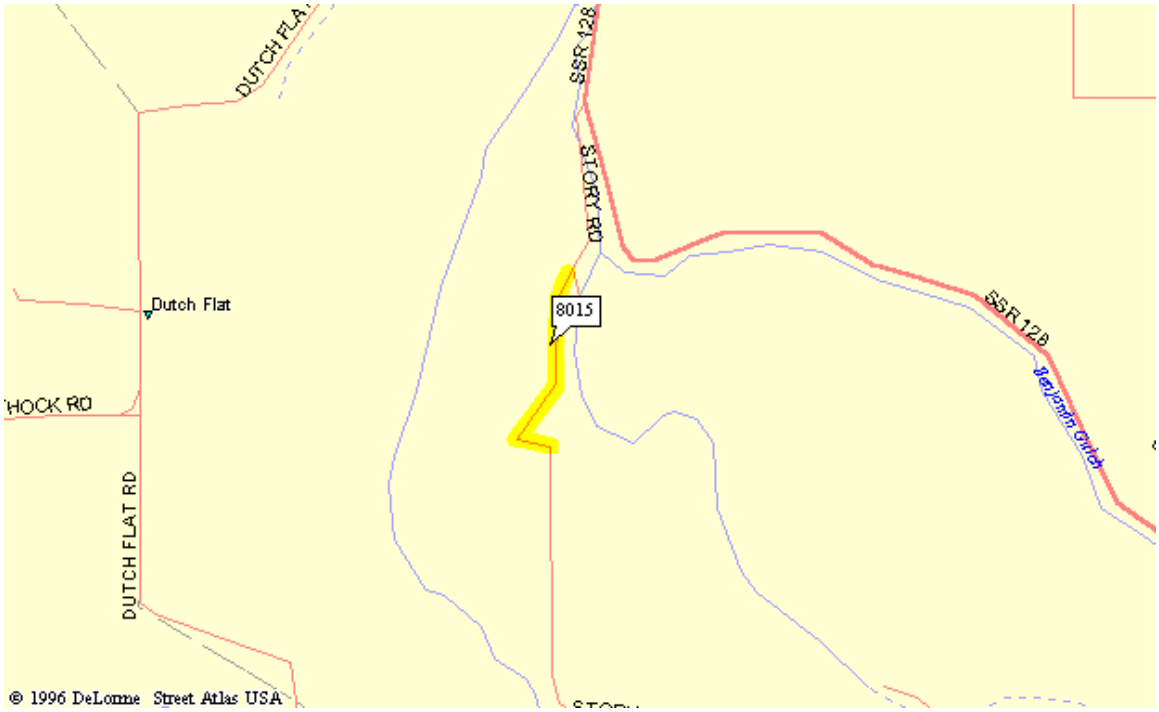
Two pass seeding is as good as no-till in reducing soil erosion. It leaves large amounts of residue on the soil surface for protection against wind and water erosion. It opens up the ground so moisture may enter more readily.

Unlike no-till seeding, most two pass systems disturb the soil in such a manner that the overall soil health is not improved and larger amounts of carbon dioxide escape into the atmosphere.

The availability of the necessary equipment to do this conservation practice is much higher than a no-till operation. Most of the chemical and fertilizer dealers have the fertilizer equipment available and many have purchased drills capable of seeding into the high residue.

This practice is the next best thing to no-till and has brought many cooperators into the area of minimum tillage, annual cropping and crop rotations.

Project: Critical Area Seeding in Pataha Creek Watershed
BPA Contract #97AP37117



Critical Area Seeding in Pataha Creek WS 1998

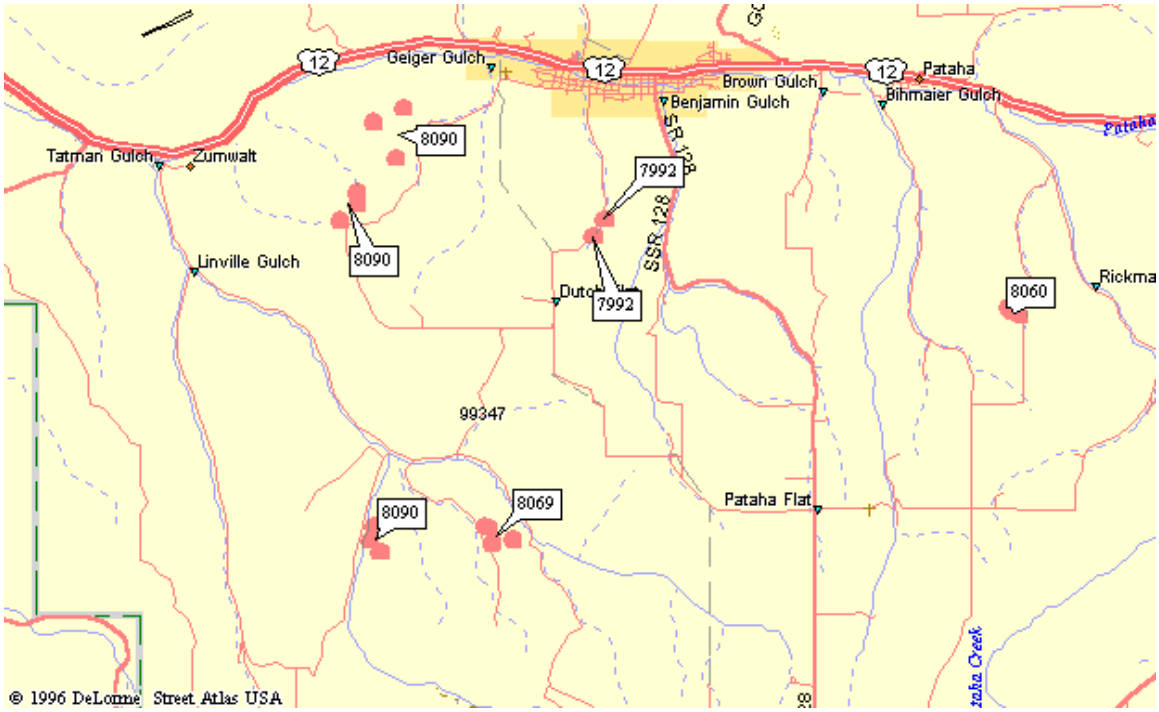
CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
8015	Richard Martin	$ 631.50	$ 631.50	4.2	248.4

This critical area seeding project took place on Garfield County road property that had been abandoned by the county. The property reverted back to the adjoining property owner who was Richard Martin.

The road which was unimproved and had no gravel or base rock was an ideal mud road for our local four wheelers. Tremendous damage occurred during the winter months and after rain storms. This road which was over a ½ mile long would run water from the top of the property line to the bottom, dumping tons of mud into Benjamin Creek, a tributary of the Pataha. This cost share provided funding to have the road shaped and smoothed to allow for grass planting. It provided for the purchase of fencing materials required to construct barriers at the top and bottom of the road section.

Presently access is denied for all vehicles and the grass is being allowed to establish. It is stabilizing the road from erosion and providing cover for the wildlife in the area.

Project: Sediment Basin Construction and cleanout in Pataha Creek Watershed
BPA Contract #97AP37117

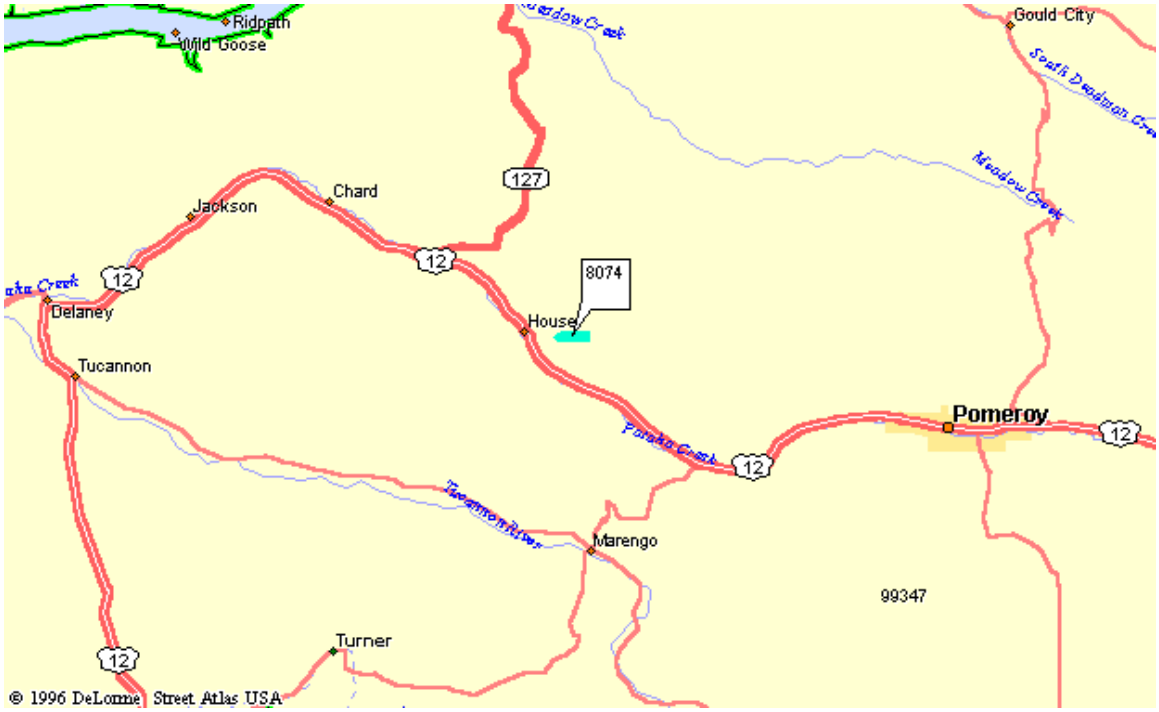


Sediment basins installed in Pataha WS 98

CS #	Operator	BPA CS	Operator CS	#	Tons soil saved
7992	Regie Waldher	$ 118	$ 40	1	20
7992	Nick Waldher	$ 118	$ 40	1	20
8060	RC Farms	$ 473	$ 155	1	120
8069	Warren Acres	$1,890	$ 630	3	25.2
8090	L&M Ranch	$4,009	$1,336	9	199
7951	Warren Acres	$ 125	$ 110	1	334
		$6,333	$2,111	15	718

Sediment basins are constructed at the ends of terraces or drainage's to collect sediment that is moving within the watershed and along these terraces. The basins slow the water to a point where the sediment of the runoff and collects in the sediment basins. The basins need periodic maintenance in the form of cleanout to remain effective drops out . Sediment basins aid to some degree in sediment reduction into our streams but are certainly not the only practice that should be utilized. The percentage of failure is relatively high.

Project: Divided Slopes installed in Pataha Creek Watershed BPA Contract #97AP37117

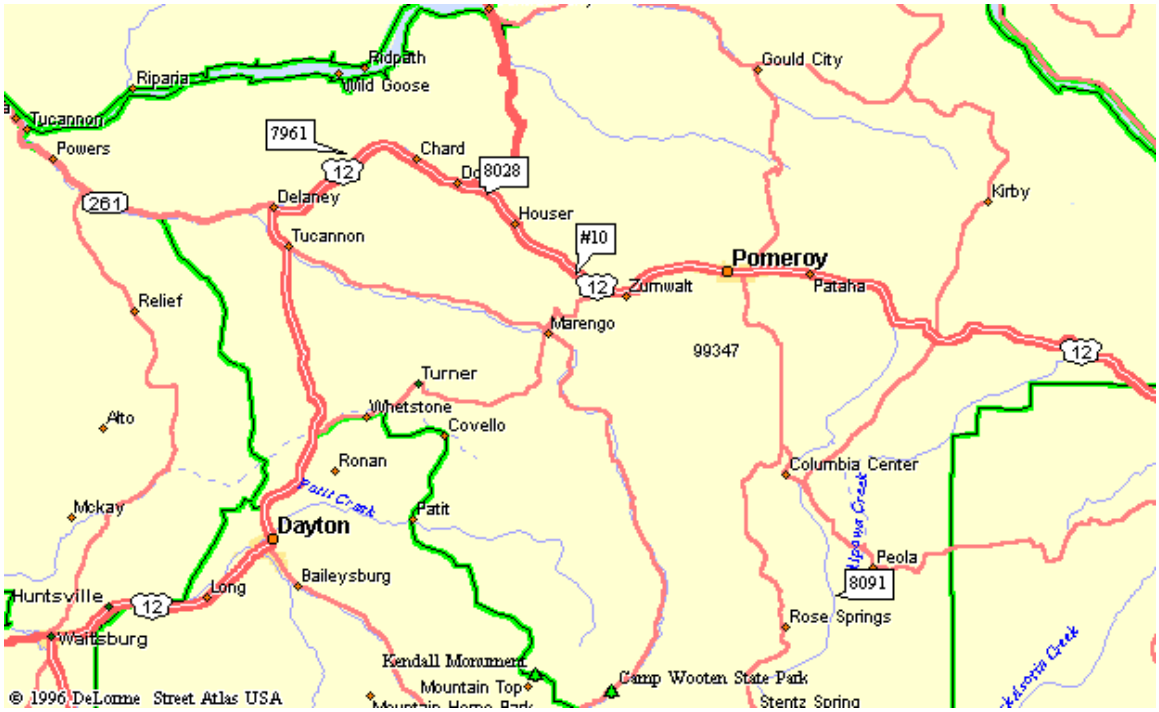


Divided slopes installed in Pataha WS 1998

CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
8074	Ed Bishop	$ 906	$ 906	128	1,108

Divided slopes are used to reduce the length of slope. They are very similar to strip cropping but do not have the exact dimensions of width that are in the strip crop specifications. Divided slopes reduce the distance that water and sediment runs down a slope. The slope is divided into portions of planted crop next to an area of previous crop residue that is either standing or rough tilled. This section of standing residue reduces the force of the water and begins filtering out some of the sediments. Strips cropping and divided slopes both help reduce erosion but some of the negative affects of these practices are the overrun of fertilizer, seed and herbicide. Some farmers report an overage of 20% on some fields. Weed problems can also develop between the strips. Strip cropping and divided slope farming incorporated into a program of minimum tillage and crop rotations can further increase the effectiveness of all the practices.

Project: Riparian and Upland Fencing in Pataha Creek Watershed
BPA Contract #97AP37117

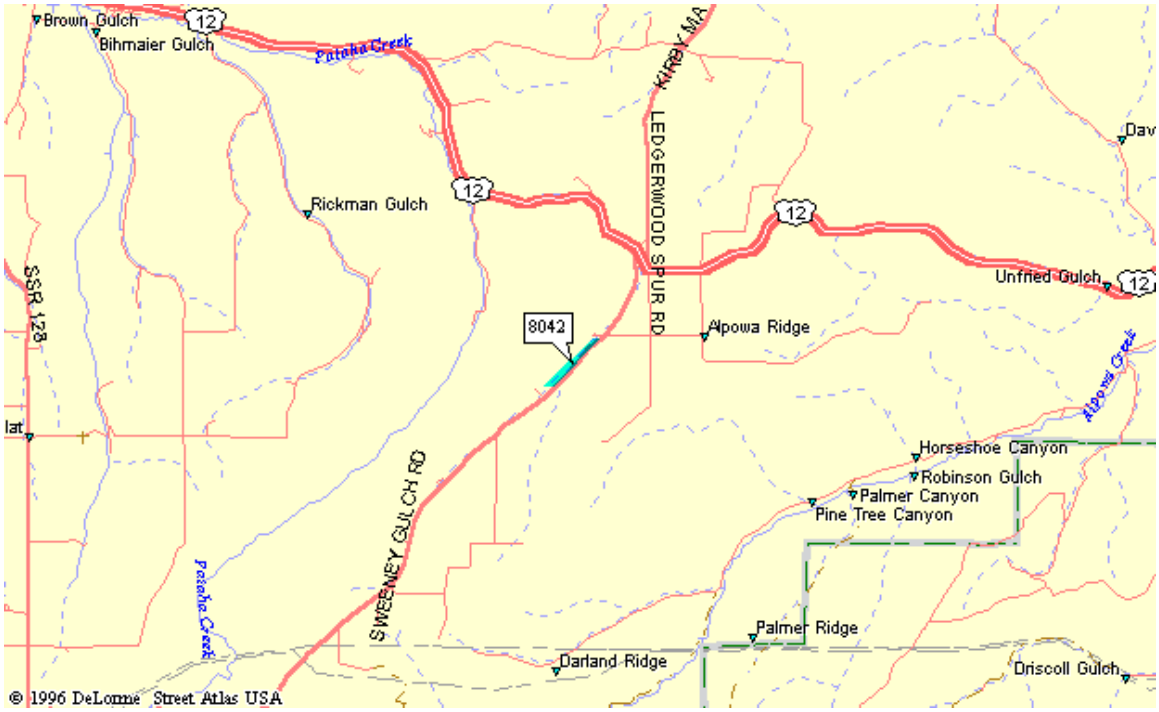


Upland and Riparian Fencing in Pataha Creek WS 1998

CS #	Operator	BPA CS	Operator CS	Feet	Tons soil saved
8028	Bruce Steel	$ 660	$ 220	660	
10	Herres Land	$1,835	$1,835	800	
8091	Arlene Wolf	$2,832	$2,832	50	
7961	DeRuwe Livestock	$9,500	$9,500	25,250	
		$4,887	$14,387	26,760	

In the Pataha Creek Watershed, riparian fencing is being accomplished through BPA Cost Share programs. As the picture shows, the riparian area along much of the Pataha Creek lacks protection to help stabilize the high stream banks. Riparian fencing has allowed the landowner to remove livestock from the areas of these high banks. This then allows them to establish trees and grasses on and along these banks to protect them from collapsing into the stream. New programs such as the new CREP program will allow more farmers access to funding in the county to implement this particular practice.

Project: Upland Buffer Strip in Pataha Creek Watershed BPA Contract #97AP37117



Riparian buffer strip in Pataha WS 1998

CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
8042	Gilbert Farms	$5,000	$2,500	24.4	366

Riparian buffers such as this one are used to establish grass and trees along the edges of the Pataha Creek and some of its major tributaries. The practice creates wildlife habitat, stabilizes stream banks, and filters the runoff from adjacent cropland.

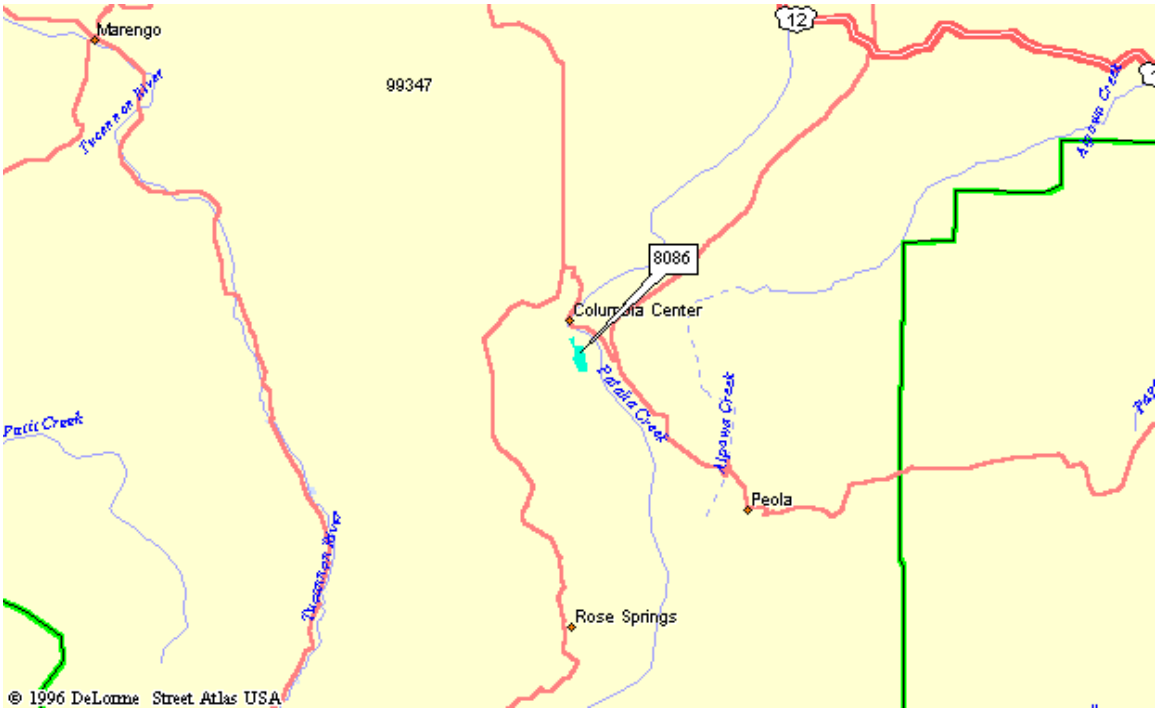
Project: Riparian Buffer Strip in Pataha Creek Watershed BPA Contract #97AP37117

Riparian Filter Strip established FY98

CS #	Operator	BPA CS	Operator CS	Acres	
10	Herres Land Co.	$1,835	$1,835	3.67	

This riparian buffer strip was cost shared with Herres Land Co. and also Washington State Department of Fish and Wildlife. The district cost share paid for a portion of the fencing while WDFW did the grass seeding on both sides of the stream. Buffer strips like this project the stream banks, filter out sediments from adjoining cropland and provide wildlife habitat.

Project: Grasses and Legumes in rotation in Pataha Creek Watershed BPA Contract #97AP37117



Grasses and Legumes in Pataha WS 1998

CS #	Operator	BPA CS	Operator CS	Acres	Tons soil saved
8086	Ledgerwood Farms	$1,209	$1,209	79	553

Cropland that has been conventionally farmed and has lost a large amount of top soil due to erosion, can be brought back to production with the introduction of grasses or legumes into the rotation. These crops increase organic matter and soil bacterial activity and can lead to the eventual improvement in crop production. This practice, in conjunction with a practice such as no-till can increase this restoration process at an increased rate.

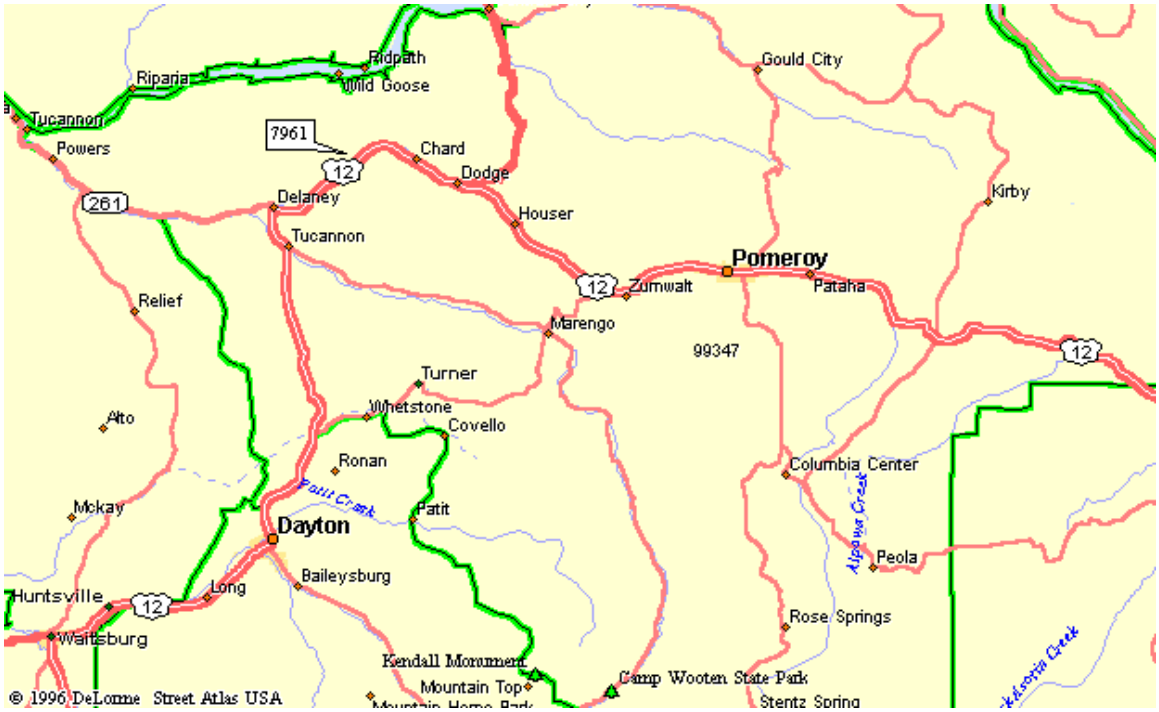
Project: Grass Waterways installed in Pataha Creek Watershed BPA Contract #97AP37117

Grassed waterways installed in Pataha WS 1998

CS #	Operator	BPA CS	Operator CS	Feet	Tons soil saved
8064	Larry Hoppe	$ 203	$ 68	884	43
8078	Patricia Cline	$ 304	$ 101	574	45
8085	Gilbert Farm	$1,084	$ 361	12,093	412
		$1,591	$ 530	13,551	500

Grassed waterways are used to reduce gully erosion in the drainage's within a field. The grass stabilizes the bottom and sides of the waterway and also collects sediment as it moves through the system. Waterways are placed at the ends of gradient terraces to transport the runoff from these terraces to areas where the cutting affect of the water is minimal.

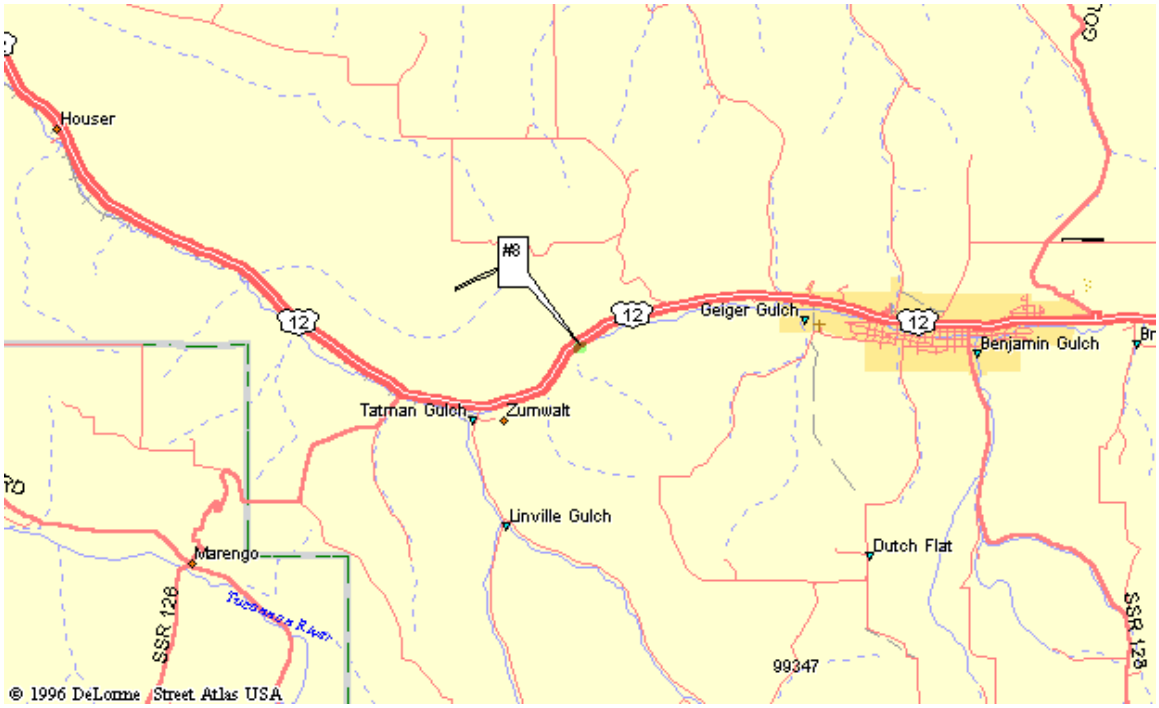
Project: Pipeline installed in Pataha Creek Watershed BPA Contract #97AP37117



CS #	Operator	BPA CS	Operator CS	Feet	
7961	DeRuwe Livestock	$1,411	$1,411	6,949	

Pipeline was installed in conjunction with upland fencing to allow for the distribution of livestock. Livestock are being moved away from the stream corridor. Water from upland springs is being piped to sections of pasture to allow for better pasture management and to allow for re-vegetation of the riparian areas along the Pataha Creek.

Project: Streambank protection in Pataha Creek Watershed BPA Contract #97AP37117



CS #	Operator	BPA CS	Operator CS	Feet	
#8 97AP37117	Ledgerwood Farms	$2,047	$2,047	100	

This rock vein was installed at the off-site watering facility to reduce the erosion of the bank below the well. Although this practice is not implemented to a high degree in the Pataha Creek, there are sites that benefit from it. An in-stream rock structure was also installed at the same time as this vein to provide a resting pool and improve fish habitat.