be useful for large areas of piñon-juniper woodlands on the Arizona Strip and the Colorado Plateau. 3. Cheatgrass abatement and monitoring- Cheatgrass is a serious symptom of poor land health. Cheatgrass out competes valuable forage and increases the risk of wildfire. This project will monitor the response of cheatgrass to different management scenarios and analyze the role of the biophysical environment to its spread. The goal is to provide management recommendations to land managers and other stakeholders that will help avoid ongoing and future invasion by cheatgrass. 4. Ponderosa Pine Restoration and Hazardous Fuel Reduction Monitoring- permanent monitoring plots in restoration-treated and control landscapes were re-measured in 2005, five years after the completion of thinning and burning treatments. Changes in forest structure, large tree mortality, tree growth, regeneration, and fuels were assessed.

Learn More (https://app.ser-rrc.org/api/v1/project/8975)

USA: California: Ah Pah Creek Watershed Restoration

Overview

Ah Pah Creek is a fourth order stream with a 16.3 square mile watershed composed entirely of steep, forested land. Virtually all of the drainage is owned by the Simpson Timber Company and is managed for commercial timber production. There are three major tributaries to the main stem: the North Fork, the South Fork and Moon Creek. The main stem upstream of the South Fork confluence is often referred to as the "Middle Fork", but is identified as the main stem. The majority of the reaches in these tributaries are moderately steep and confined. The main stem enters a wider alluvial valley downstream of the South Fork confluence and its lower reaches, as well as the lower reach of each of the tributaries, are less confined and lower gradient. The main stem and South Fork Ah Pah Creek, as well as Moon Creek, support populations of coho salmon, steelhead, and coastal cutthroat trout. The North Fork supports populations of steelhead and coastal cutthroat trout, with coho only being sporadically observed in recent Yoruk Tribal Fisheries Program (YTFP) surveys. Chinook salmon have been observed sporadically in the lower portion of drainage over the last 20 years but are not routinely found in Ah Pah or its tributaries. Extensive logging road networks were constructed and intensive logging occurred throughout the Ah Pah watershed between the late 1940's and mid-1960's and these activities had widespread impacts on aquatic and riparian habitat throughout the drainage. In addition, the Highway 101 Redwood Park Bypass was constructed across the headwaters of the Ah Pah Creek drainage in the late 1980's and had substantial additional deleterious effects on streambed sedimentation levels and habitat quality throughout the basin. Yoruk Tribal Watershed Restoration Program (YTWRP) conducted a road network inventory throughout the Ah Pah drainage in winter 1997-1998 and has since decommissioned several miles of high treatment priority roads in each of the tributaries. YTFP and the California Conservation Corps (CCC) have collaborated efforts to address riparian restoration needs within the drainage, including extensive riparian conifer planting in each of tributaries. In addition, the CCC have constructed numerous instream habitat structures within the main stem and South Fork in an attempt to improve habitat quality and complexity and fish passage in these drainages.

Project Details

Lead Entity:

Yoruk Tribal Watershed Restoration Program (YTWRP)

Lead entity types:

- Other

Partner Organizations:

California Conservation Corps (CCC)

Adaptive management

Describe adaptive management processes and mid-course corrections taken to address unforeseen challenges and improve outcomes in each of the following categories:

Other:

After implementing the North Coast Riparian Restoration Project (of which Ah Pah Creek was a part), managers decided that in the future, proposals for this size of restoration project need to address site preparation and long term maintenance in order to ensure high seedling survival rates. In addition, the growing conditions of each planting site need to be evaluated to improve appropriate tree species selection. The lessons learned from this project were well applied in the Riparian Restoration Project Maintenance on Lower Klamath River Tributaries. Californina Conservation Corps (CCC) crews in-planted approximately 9,500 trees and completed tree maintenance on eight Lower Klamath River tributaries. Tree species planted included Sitka spruce, Coastal redwood, and Grand fir. Most of the areas planted were stream side terraces dominated by alder and dense understory brush. These conditions required trees that could thrive in shaded, wet locations. Coastal redwoods were planted in densely shaded areas and lower terraces. Grand firs were planted in more open, sunlit areas, and Sitka spruce were planted at all the sites because of their high tolerance of stream terrace conditions. Douglas fir was not planted on any of the sites due to its intolerance of dense shade and seasonal inundation. The trees in-planted and maintenanced during this project had high survival rates of 80% to

90%. This was higher than the survival rates observed before the maintenance projects implementation. These increases confirm that the lessons learned from other riparian plantings were well-applied on this maintenance project. CCC crews attended a three day training in January 2005 focused around tree planting techniques, conditions preferred by tree species and common planting/ maintenance mistakes. The training was developed with the intention of providing crews better information with which to make planting decisions. These decisions would then be reflected in a reduction of tree mortalities caused by improper planting. At this time it is hard to judge how effective these trainings were in improving tree survival rates for trees planted in February 2005. The survival surveys conducted were unable to separate tree mortalities by year. One item of note from the mainenance project is that the removal or readjustment of Vexar tubes also proved important to future tree survival. For example, the majority of the redwood trees planted on Hunter Creek over three years ago were greater than 2 feet tall. At this time, the Vexar tree protectors were no longer providing any protection from deer browse. Such instances reiterated the need for long term maintenance on planting projects. In addition, trees planted in flood prone areas with Vexar were found completely bent over. Flood events in the winter of 2004-2005 had pushed over and/or pulled the tree protectors from some of the trees. The Vexar had become a hindrance, weighting down and bending the trees in these areas. In the future, Vexar tubes will not be placed on seedlings planted in flood prone areas.

State of Progress:

- Closed/completed, no further follow-up

Project Start:

1992-01-01

Project End:

2001-01-01

Total budgeted expenses:

- USD 250,000-500,000

Main source of funds:

- Private companies, landowners
- National government and public institution

Global Regions:

- Northern America
- Americas
- World

Countries:

- United States of America

Ecosystem Functional Groups / Biomes:

- Temperate-boreal forests and woodlands biome
- Rivers and streams biome

Extent of project:

- Other

Extent of restoration:

- Other

Degradations:

- Deforestation
- Other industrial and urban development
- Non-timber natural resource extraction (including fuelwood)
- Drainage and hydrologic changes

Description:

The arrival of 49ers with the Gold Rush were the first in a long history increasing sedimentation in the watersheds of the lower Klamath River. Widespread timber harvest of the redwoods resulted in over a hundred fifty miles of roads being constructed in the upper Ah Pah watershed by the US Forest Service and Simpson Timber Company. These intensive land use practices, interstate road construction flood events, and stream clearance projects left Ah Pah Creek with little instream fish habitat. The Klamath river is well known for its salmon fisheries and much of the Northern California and Southern Oregon fishing industry depended upon the Klamath as a major source of salmon for their economic well-being. However, the increased sedimentation in the watershed due to first mining and later timber harvest, as well as upstream damming

projects for hydroelectric power and irrigation led to a drastic decline in the salmon populations in the entire river basin. Changes in channel morphology throughout the system due to changing hydrological conditions associated with timber operations, changing temperature of the water because of upstream dams, widespread increased sedimentation, and the lack of spawning habitat all contributed to the decline of the river's fishery.

Planning and Review

Goals and Objectives

Was a baseline assessment conducted:

unsure

Was a reference model used:

UNSURE

were_goals_identified:

YES

Goals and objectives:

- Other

Goals Description::

In 1986, Congress passed the Klamath River Basin Act noting that "floods, the construction and operation of dams, diversions and hydroelectric projects, past mining, timber harvest practices, and road-building have all contributed to sedimentation, reduced flows, and degraded water quality which have significantly reduced the anadromous fish habitat in the Klamath River system." The act authorized a 20 year Federal-Sate cooperative Klamath River Basin Area Restoration program to restore the Klamath River Basin fish stocks. Out of this grew training programs in 1999 run by the Yurok tribe for Watershed Restoration Training and Implementation Program. The goal of the multi-year restoration effort was to remediate man-caused sediment sources from 30 tributary sub-basins within the Lower Klamath River Basin, Ah Pah Creek being one of these. The program grew out of long-term restoration goals of the Yurok Tribe: 1) to restore the Klamath River fisheries to their healthiest possible condition and create job training and employment opportunities for Tribal members.

Stakeholder Engagement

Were Stakeholders engaged?:

unsure

Description of Stakeholder Involvement:

The Yurok tribe initiated the large-scale, coordinated watershed restoration effort throughout the Lower Klamath sub-basin in conjunction with the Simpson Timber Compay and the California Coastal Conservancy. The Ah Pah Creek restoration is significant because it involves work done partially on Yurok tribal lands by Yurok restorationists, as well as on lands owned by the Simpson Timber Company. It is a broader collaborative endeavor that includes the Yurok tribe, the US Fish and Wildlife Service, the California Department of Fish and Game, the California Conservation Corps, the Bureau of Indian Affairs, Bureau of Land Management, United States Forest Service, and the United States Department of the Interior. It also involves the Simpson Timber Company as both land owner and funder for the various projects. The Yurok tribe owns the land along the river and depends heavily upon the existence of salmon for their livelihood and the continuation of their cultural traditions.

Ecosystem Activities and Approaches

General Activities: Road Decomissioning: Project activities included road abandonment, decommissioning, and obliteration (decommissioning); or road drainage improvements, stormproofing, landslide treatments and culvert/stream crossing upgrades (upgrades) for 15 miles of road. Road conditions were initially assessed by examining road inventory maps provided by the landowner and by on-the-ground site visits by the cooperator and USFWS. Sites were prioritized through these assessments to determine the most cost effective use of grant funds. Roads were decommissioned, storm proofed or upgraded using excavators, bulldozers, dump trucks, graders and loaders, according to site specific conditions and future use needs. Culvert replacement, bioengineered stabilization structures, riparian restoration, culvert trash rack construction, mulching and planting were noted to also require considerable hand labor. Upgrading and storm proofing roads involved

excavating unstable sidecast and uncompacted fill to a more stable location, installing new and appropriately sized culverts, installation of rolling dips to allow use of the road, while diverting runoff from the road surface, and regrading the road prism to disconnect the road and ditch from stream channel functions. Road decommissioning involved ripping compacted surfaces, excavating unstable fill and fill near stream crossings, removal of unmaintained culverts and "Humboldt" crossings and outsloping the terrain to mimic natural topography. Several stream crossings and log landing sites along the road were also treated. Unstable fills and log landings with the potential to add sediment to the stream or which are already failing will be addressed as well as stream crossings that divert water and those that have the potential to do so. The treatments involved complete removal of all original soil used to create stream crossings including metal or plastic culverts and stream crossings constructed of wood. Excavation of crossings will occur down to the natural stream channel and slope as much as possible. Unstable soil perched along the outer edges of the road and log landings was pulled back and placed to create a natural slope, and at some sites the soil were removed and placed in a geologically stable location. 5 barrier modifications were performed, 28 log structures were installed, and 1 Hewitt ramp was maintained in the riparian corridor. Construction of 20 stream bank stabilization and large woody debris structures, complete shaping and rehabilitation of seven acres of flood plain, terracing and revegetation of the riparian corridor. These actions are intended to decrease sedimentation, increase riparian cover and improve salmonid migrations. Tree Planting: All riparian planting was conducted using standard planting techniques such as those discussed in Flosi and Reynolds (1994). Crews planted the provided bare-root conifers (average size 1-2 feet tall) using a hoedad, with care taken to properly bury the root system to prevent "J-rooting"□ and properly stabilize the trees. Most effects of poorly planted trees typically show signs within the first few years. Redwood and Douglas fir trees were planted evenly in areas that were considered to support both species of trees. Habitat areas that received direct sunlight and/or hotter summertime temperatures were planted with a higher concentration of Douglas fir trees, while areas that had a denser overstory were planted with higher concentrations of redwood trees. All trees were stored in a refrigerated cold storage facility that provided optimal conditions before planting occurred (provided by Simpson Resource Company). Tree planting crews consisted of 2-4 members, each of which carried approximately 200-300 trees each in planting bags. In extremely remote areas extra trees were packed into the designated planting area to cut down on transport time. Trees were planted at a spacing of approximately 8-10 feet, with favorable microsite when planting trees (such as shaded locations behind logs or stumps). Ideal planting spots are found where the soil is deep, well drained, and free of large obstructions. Crews would typically start planting at the most distant location and work their way back out, thus avoiding the possibility of stepping on previously planted trees. Alder Thinning: YTFP inventoried each tree thinning reach to enumerate conifers that had not yet succeeded above the dense alder canopy. YTFP crews marked each of the identified trees that was at least 10 feet from and no more then 100 feet from the creek with survey flagging and a sequentially numbered metal tree tag. Crews then fell the minimum number of alder trees around each conifer necessary to adequately open the tree canopy for increased sunlight penetration and unobstructed canopy succession. Every fifth tagged conifer (20% of total) was left as is, with no alteration of the alder overstory. For every tagged conifer, the following information was recorded: species, height, diameter (at dbh), distance from creek, location along creek, number of alders felled around tree (if any), and tag number. This collected data, along with the 20% in which no alteration occurred, allows for long term monitoring of the effectiveness of this approach to encouraging reestablishment of a conifer-dominated canopy. YTFP will be revisiting each reach on a five-year interval to recollect this data. This will allow an assessment of change in tree size for both the trees where the alders were thinned and for those in which no alteration of the canopy occurred.

Project Outcomes

Eliminate existing threats to the ecosystem: In order to address chronic sedimentation with both drainages, YTFP conducted road network and sedimentation delivery assessments in Ah Pah Creek during winter 1997-1998. This inventories assessed all road and skid-trail networks within the drainage and prioritized each potential failure (slope failure) site based on potential quantity of delivered sediment and treatment urgency. In response to these assessments, YTFP conducted road decommissioning and upgrade on high priority sites within the basin during summer 1998-2000. By 2002, approximately 20 miles of high priority roads in Ah Pah, McGarvey and Tectah (adjacent watersheds) Creeks have been decommissioned by YTFP, as well as treating numerous landings and removal several defunct log bridges. Of these 20 miles of decommissioned roads, â‰ˆ5 miles within McGarvey Creek, â‰ˆ5 miles within Ah Pah Creek, and â‰ˆ2 within Tectah Creek were located directly along the streams and their major tributaries. Simpson Resource Company (Simpson), the principal landowner in all three drainages, donated 10,000 bareroot coastal redwood and Douglas fir trees (â‰ˆ12-24" in height) to YTFP during 2002 to revegetate these decommissioned riparian road segments. YTFP planted these trees during winter 2002 on approximately eight of the twelve miles of riparian decommissioned roads. A total of 10,000 bareroot redwood and Douglas fir trees were planted along recently decommissioned roads within the riparian corridor of McGarvey, Ah Pah, and Tectah creeks. These recently outsloped and ripped roads provided an excellent opportunity to reestablish redwood and Douglas fir adjacent to these streams before competing alder and berry species (Rubus sp.) could get established. Normally the undergrowth is too extensive to allow for successful tree planting in these areas, while the dense alder overstory results in excessively slow growth rates for the planted trees. The decommissioned roadways are currently clear of vegetation, however, as well as providing a corridor of increased canopy opening. Redwood and Douglas fir trees were planted in particular habitat regions based on riparian canopy cover and average climate. A decommissioned road network in upper South Fork Ah Pah was planted with approximately 2,000 trees, consisting of 50 % redwood and 50% Douglas fir trees. Twenty clusters of conifers were thinned in upper mainstem Ah Pah Creek. A total 50 redwood and 7 Douglas fir trees were released in this reach. Douglas fir trees ranged from 1.6-10.2 inches in diameter, with an average of 4.7 inches, while the diameter of redwood trees ranged from 1.3-22.9 inches, with an average diameter of 6.6 inches. Douglas fir tree ranged from 10-60 feet in height with an average height of 26 feet, while redwood trees ranged in height from 7-50 feet, with an average of 28 feet. A total of 92 alders were thinned from both redwood and Douglas fir trees along the South Fork Ah Pah Creek. Nineteen clusters of conifers were thinned in South Fork Ah Pah Creek. A total of 28 redwood and 47 Douglas fir trees were released in this reach. Douglas fir trees ranged from 1.6-12.1 inches in diameter, with an average of 3.9 inches, while the diameter of redwood trees ranged from 1.6-14.3 inches, averaging 5.7 inches. Douglas fir tree ranged from 8-80 feet with an average height of 28 feet, while redwoods ranged in height from 10-70 feet, with an average of 29 feet. A total of 125 alders were thinned while releasing these conifers along South Fork Ah Pah Creek. Factors limiting recovery of the ecosystem: While on a specific watershed

level the improvements in habitat have been clear and are continuing to mature with successive maintenance projects, at the larger Klamath River basin level the benefits to salmon have been challenged by larger political and ecological concerns. In 2002, an enormous salmon kill occurred on the lower Klamath River as a consequence of elevated water temperatures. Between 35,000 and 70,000 fish are thought to have died as a consequence. While pinpointing the problem has been a challenge for ecologists, the reduced flows in that year are thought to have been a significant contributor. Due to continuing drought in the enormously productive agricultural region in the Upper Klamath, water for downstream purposes was curtailed in the summer of 2001. These swirling political concerns have continued up to the present day, when at this writing a provisional settlement on the Klamath River basin has been announced pending approval of PacificCorp. The agreement proposes to remove four major hydroelectric dams from the river. If this project proceeds its initial completion date is 2015 and will represent the largest dam decommissioning in the United States and no doubt will expand the efforts of the Klamath River basin restoration. Economic vitality and local livelihoods: Because the Klamath River is such an important river for salmon, restoration of salmon habitat is essential for their continued survivial. To the Yurok it is critical because salmon are the foundation of their culture and restoration of the Klamath to support continued salmon habitat is critical as well. Salmon is vital to the larger region because of its value as a food source and the economic importance it has all along the Northern California and Oregon coast to fisherman.

Monitoring and Data Sharing

Does the project have a defined monitoring plan?:

NO

Open Access URL:

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Long Term Management

STAPER

Chronicle / Paul Chinn

USA: California: Bair Island Restoration Project (San Francisco Bay) (https://app.ser-rrc.org/api/v1/project/8783)

Country: United States of America

Activities:

Biomes: