Lower Klamath Sub-Basin Riparian Restoration Project
Project Completion Report – FY 2002

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Introduction

The Yurok People have inhabited the lands of and sustained themselves upon the resources of the Klamath River for centuries. The Yurok Tribe's entire culture is largely based upon the Klamath River and its associated fish populations. Today, only a fraction of historic anadromous fish runs return to spawn in the Klamath River and its tributaries. Although many factors have contributed to these declines in native fish runs, degradation of freshwater habitat has been pervasive in the Klamath River Basin. Kier and Associates (1991) note that "the fish habitats of the basin have been greatly diminished in extent and value in the past century by the construction of impassable dams and by stream diversions and sand and silt from mining, logging, grazing, road development, and floods." The declining health and productivity of the Klamath River's anadromous fisheries is of great cultural and economic concern to the Yurok Tribe.

Past timber harvest practices in the Lower Klamath sub-basin have severely degraded aquatic habitat throughout many of the tributaries. This sub-basin, as defined in the Klamath Restoration Program's Long Range Plan (Kier and Associates 1991), includes all Klamath tributaries downstream of the confluence of the Trinity River, encompassing a drainage area of approximately 450 square miles. Extensive road networks have been constructed on steep, naturally fragile terrain, resulting in chronic streambed sedimentation over the last 50 years (Balanced Hydrologics, Inc. 1995; Gale and Randolph 2000). These activities have contributed to the decline of native stocks of chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), steelhead trout (*O. mykiss*), and coastal cutthroat trout (*O. clarki clarki*). Coho salmon within the Klamath Basin are listed as threatened under the federal Endangered Species Act (ESA) and have been found to warrant listing as threatened under the California ESA. Chinook salmon, steelhead and sea-run cutthroat trout have all previously been petitioned for federal listing and their status within the Klamath Basin continues to be a source of great concern.

To proactively address these declines, the Tribe initiated a large-scale, coordinated watershed restoration effort throughout the Lower Klamath sub-basin in conjunction with Simpson Resource Company and the California Coastal Conservancy. This cooperative framework is intended to meet the mandates and objectives of tribal, state, and federal planning efforts, the Northwest Economic Adjustment Initiative and the state and federal ESA through innovative solutions to resource management issues between private landowners, Tribal interests, and public agencies.

In order to provide for meaningful restoration plans that truly address the limiting factors facing each salmonid species in a given drainage, the Yurok Tribe initiated the Lower Klamath River Watershed Assessment. This interdisciplinary effort, consisting of historical and current condition assessments throughout each of the Lower Klamath tributaries, resulted in the prioritization of restoration activities throughout the basin. The Lower Klamath Sub-Basin Watershed Restoration Plan (Gale and Randolph 2000) identifies chronic streambed sedimentation, heavily degraded instream and riparian habitat, and loss of habitat connectivity as the primary factors for salmonid decline. In order to address these problems, the Sub-Basin Plan prioritizes treatment of upslope

sediment sources, in conjunction with instream and riparian restoration and fish barrier treatment.

This project undertook revegetation of conifers within the riparian corridor in McGarvey, Ah Pah, and Tectah Creeks. The Yurok Tribal Fisheries Program (YTFP) has documented through watershed assessment activities that existing and future sources of large woody debris (LWD) are virtually non-existent within these tributaries. The reestablishment of riparian conifers and the restoration of riparian habitat throughout the lower Klamath sub-basin has been identified as a priority restoration activity in the Lower Klamath Sub-basin Watershed Restoration Plan (Gale and Randolph 2000). These three tributaries are all prioritized as top priority recipients of watershed restoration activities (Gale and Randolph 2000), and upslope restoration and erosion control projects have been implemented and are ongoing in all three drainages.

Figure 1. YTFP crewmember planting bareroot conifers on the decommissioned M-800 road, West Fork McGarvey Creek, lower Klamath River, California, 2002.

Study Area

McGarvey Creek - McGarvey Creek is a third order stream draining 8.9 square miles of moderately steep, forested lands. McGarvey Creek's mainstem begins at an elevation of 5 feet at its confluence with the Klamath and extends 4.9 miles to its headwaters, located at an elevation of 600 feet. West Fork McGarvey Creek, the principle tributary in the drainage, totals 2.2 miles in length. Virtually all of McGarvey Creek is owned by Simpson and is managed for commercial timber production.

McGarvey Creek suffers from chronic streambed sedimentation, resulting from a combination of pervasive logging road and hillslope failures and massive sedimentation resulting from the construction of the Highway 101 Redwood Park Bypass across the headwaters of the mainstem and West Fork. Despite this excessive sedimentation, McGarvey Creek's low-gradient woody habitat still maintains populations of coho salmon, steelhead, coastal cutthroat trout and lamprey. In addition, juvenile chinook have been sampled in YTFP's downstream migrant trap on a sporadic basis.

Based on the presence of these persistent salmonid populations, together with the realization of McGarvey Creek's potential for high quality coho habitat once restored, YTFP designated it one of the highest priority streams for restoration activities (Gale and Randolph 2000). YTWRP conducted a road inventory during winter 1996-1997 and road decommissioning activities began the following summer. YTWRP has decommissioned several miles of high priority roads to date, with additional decommissioning plans as funds are secured. In addition, Simpson redesigned the remaining road network to meet their future management needs and have done extensive road upgrading throughout much of these remaining roads. In addition to upslope restoration activities, YTFP has undertaken extensive riparian replanting with assistance from the CCC. In addition, YTFP has been working to address extensive fish passage barriers throughout the mainstem in an effort to reestablish habitat connectivity throughout the watershed.

Ah Pah Creek - 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 Simpson and is managed for commercial timber production.

There are three major tributaries to the mainstem: the North Fork, the South Fork and Moon Creek. The mainstem upstream of the South Fork confluence is often referred to as the "Middle Fork", but is identified as the mainstem throughout its course for the purposes of this report. The majority of the reaches in these tributaries are moderately steep and confined ("B" type channels dominant – see Rosgen 1994 for channel type descriptions). The mainstem 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 ("C" type channel dominant).

Mainstem 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 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 (Scott Bauer, personal communication).

Extensive logging road networks were constructed and intensive logging occurred throughout the Ah Pah watershed between the late 1940's and mid-1960's (Gale and Randolph 2000). 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.

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 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 mainstem and South Fork in an attempt to improve habitat quality and complexity and fish passage in these drainages.

Tectah Creek - Tectah Creek is a large third order stream that flows 13.7 miles from its headwaters at an elevation of 1800 feet to its confluence with the Klamath River at RM 21.8. Tectah Creek drains a 19.8 square mile watershed composed exclusively of steep, mountainous terrain. Tectah Creek does not contain any significant fish-bearing tributaries, other then in the headwaters where the creek splits into two even-sized drainages. Tectah Creek is moderately to highly confined throughout most of its course, with "B" channel dominant throughout (see Rosgen 1994 for channel type descriptions).

As occurred with all of the south-side tributaries in the upper half of the sub-basin, Tectah Creek was subjected to extensive timber harvesting and related road construction between the mid-1950's to mid-1960's. In the case of Tectah Creek, approximately 77% of the watershed was logged in a 6-8 year period (Gale and Randolph 2000). Despite this legacy of intensive land management, Tectah Creek has maintained or re-established moderately good quality habitat throughout most of its course. Low instream LWD density and insufficient supplies of future LWD, however, were documented in most of the Tectah Creek drainage. As with many Lower Klamath tributaries, virtually all conifers were removed from Tectah's riparian corridor during past logging activities, resulting in a riparian canopy now composed almost entirely of mature red alder (*Alnus rubra*).

Tectah Creek supports populations of chinook and coho salmon, steelhead, coastal cutthroat trout and lamprey. While salmon have only been observed in the lower reaches of the drainage, steelhead have been documented as the dominant fish species throughout the majority of the drainage. Coastal cutthroat trout are predominantly only found in the upper ~25% of the drainage, and are the sole salmonid species present upstream of ~RM 9.0, where they are found in moderate densities throughout most of the headwaters.

Methods and Materials

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 (Cleary et al. 1978). 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 crewmembers being careful to pick the most 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 (Cleary et al. 1978). 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.

Results and Discussion

Tree Planting

In order to address chronic sedimentation with both drainages, YTFP conducted road network and sedimentation delivery assessments in McGarvey Creek during winter 1996-1997, Ah Pah Creek during winter 1997-1998, and Tectah Creek during winter 1998-1999. These inventories assessed all road and skid-trail networks within each drainage and prioritized each potential 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 each basin during summer 1998-2000. To date approximately 20 miles of high priority roads in McGarvey, Ah Pah and Tectah 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, ≈5 miles within McGarvey Creek, ≈5 miles within Ah Pah Creek, and ≈2 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 (≈12-24" 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 (Table 1). 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 (Figure 2). 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 (Figure 2). Redwood and Douglas fir trees were planted in particular habitat regions based on riparian canopy cover and average climate. Regions with higher canopy cover and cooler climates were planted with a higher percentage of redwoods (ex. McGarvey Creek).

Redwood and Douglas fir trees were planted along approximately 5 miles of decommissioned roads within the riparian area of mainstem and West Fork McGarvey Creek (Figure 3). A total of 2,500 trees were planted along the mainstem, with approximately 75% (n=1,875) redwood and 25% (n=625) Douglas fir (Table 1). 2,000 conifers were planted along West Fork McGarvey Creek, comprised of approximately 75% (n=1,500) redwood and 25 % (n=500) Douglas fir.

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 (Table 1, Figure 4). Approximately 3,500 trees were planted along 2 miles of decommissioned roads in upper Tectah Creek, consisting of 75% (n=2,625) Douglas fir and 25% (n=875) redwood (Table 1, Figure 5).

Table 1. Total number of conifers planted in select tributaries, Lower Klamath River, California, 2002.

Stream	Coastal Redwood	Douglas Fir	Total trees planted
McGarvey Creek	1,875	625	2,500
West Fork McGarvey Creek	1,500	500	2,000
South Fork Ah Pah	1,000	1,000	2,000
Tectah Creek	825	2,625	3,500
Total	5,200	4,750	10,000

Figure 2. YTFP crewmembers planting trees on the decommissioned T-140 road, Tectah Creek, lower Klamath River, California, 2002.

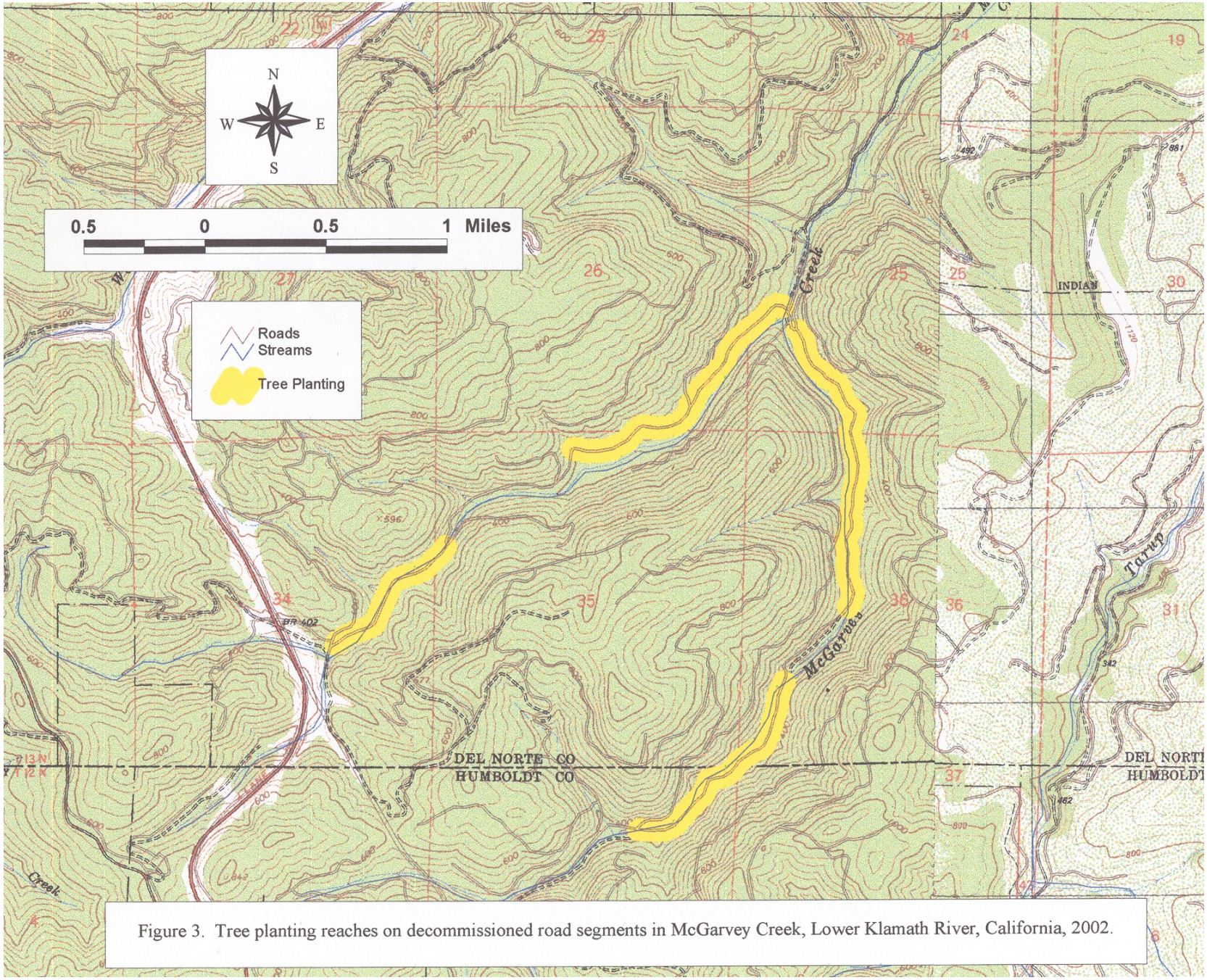

Figure 3. Tree planting reaches on decommissioned road segments in McGarvey Creek, Lower Klamath River, California, 2002.

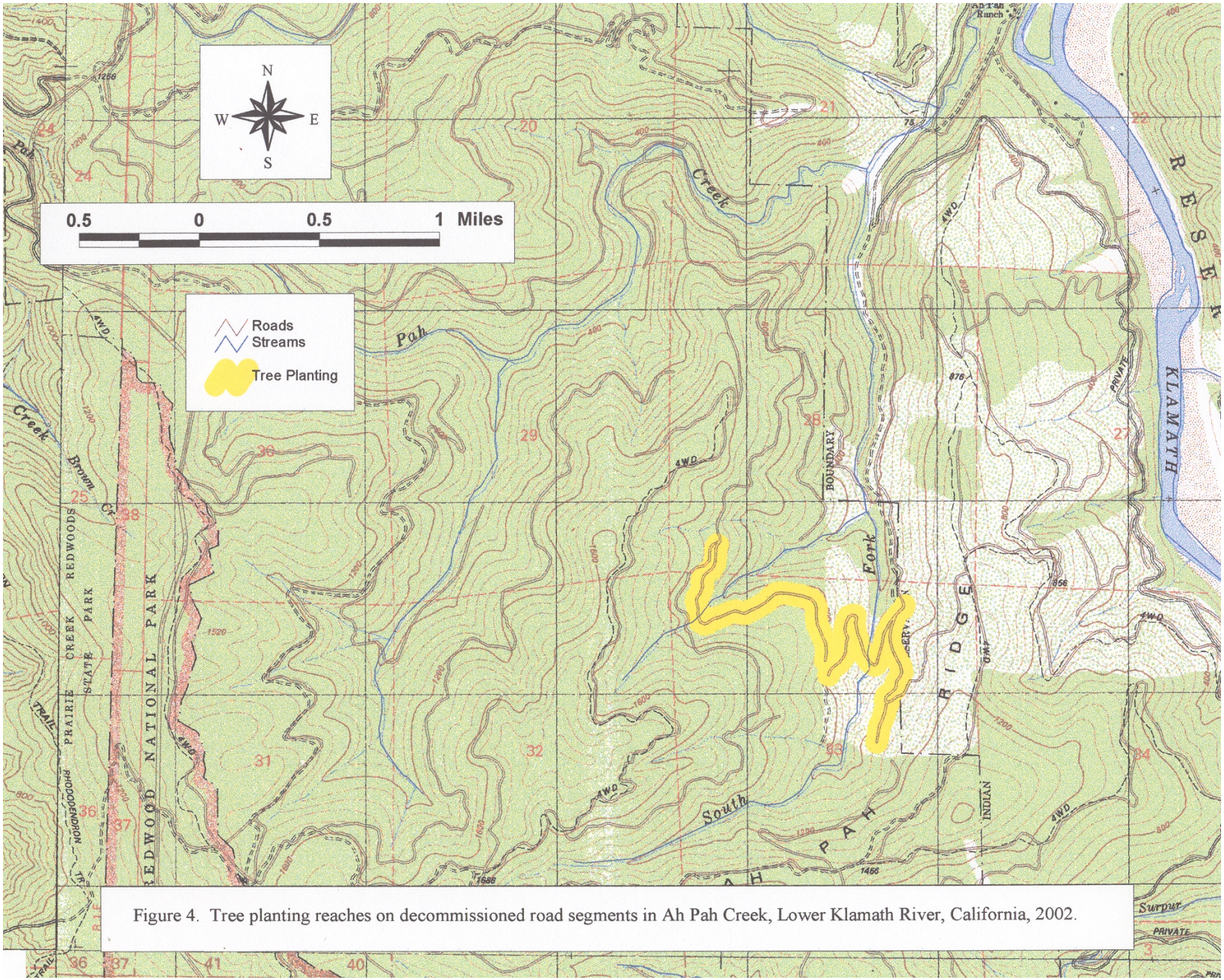

Figure 4. Tree planting reaches on decommissioned road segments in Ah Pah Creek, Lower Klamath River, California, 2002.

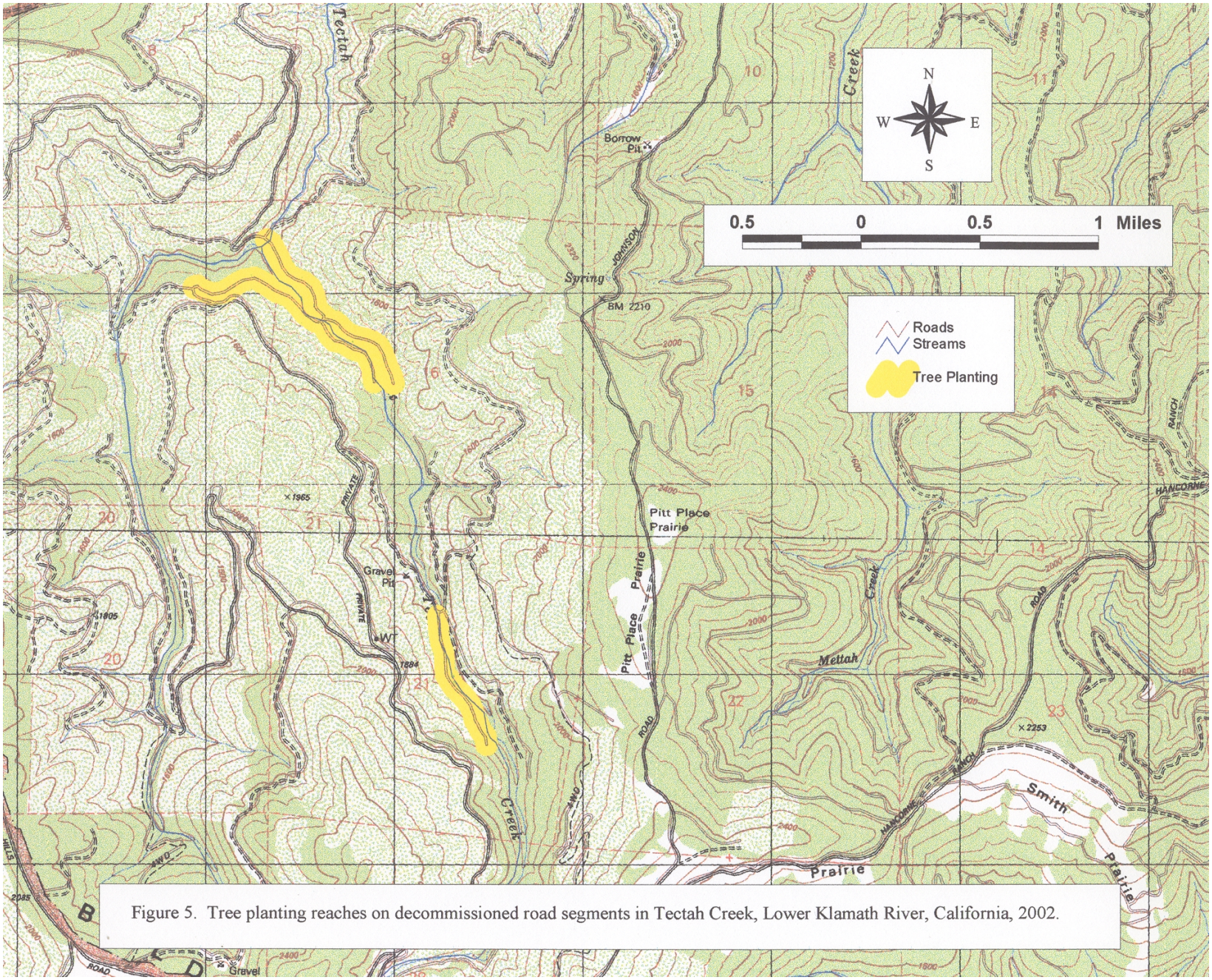

Figure 5. Tree planting reaches on decommissioned road segments in Tectah Creek, Lower Klamath River, California, 2002.

Alder Thinning

McGarvey Creek

Twenty clusters of conifers were thinned within the mainstem McGarvey Creek reach (Figure 6). A total of 72 redwood and 19 Douglas fir trees were released in this reach (Table 2). The diameter of Douglas fir trees ranged from 0.6-8.0 inches (dbh) with an average diameter of 3.3 inches, while the diameter of redwood trees ranged from 1.4-13.1 inches with an average diameter of 5.3 inches (Tables 2-3). The average height of the Douglas fir trees was 24 feet, while the average height of the released redwood trees was 30 feet. The conifers ranged from 15-95 feet from the creek, with an average distance of 42 feet. A total of 108 alders were thinned while releasing these conifers along mainstem McGarvey Creek.

Twenty-eight clusters of conifers were thinned in West fork McGarvey Creek (Figure 6). A total of 78 redwood and 6 Douglas fir trees were released in this reach (Table 2). The diameter of Douglas fir trees ranged from 2,2-5.1 inches, with an average diameter of 3.4 inches, while the diameter of redwood trees ranged from 1.4-15.9 inches, with an average of 5.9 inches (Tables 2, 4). Douglas fir tree heights ranged from 15-40 feet with an average height of 23 feet, while the average height of redwood trees was ranged from 10-100 feet, with an average of 25 feet. A total of 94 alders were thinned from both redwood and Douglas fir trees along the West Fork McGarvey Creek.

Ah Pah Creek

Twenty clusters of conifers were thinned in upper mainstem Ah Pah Creek (Figure 7). A total 50 redwood and 7 Douglas fir trees were released in this reach (Table 2). 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 (Tables 2, 5). 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 (Figure 7). A total of 28 redwood and 47 Douglas fir trees were released in this reach (Table 2). 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 (Tables 2, 6). 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.

Table 2. Summary of conifers released and alders thinned by tributary, lower Klamath River, California 2002.

Upper Mainstem McGarvey Creek		
	Coastal Redwood	Douglas Fir
Average Tree Diameter (Inches)	5.3	3.3
Average Tree Height (Feet)	30	24
Total Number of Conifers Measured	75	22
Total Number of Conifers Released	72	19
Total Number of Alders Thinned	108	
West Fork McGarvey Creek		
	Coastal Redwood	Douglas Fir
Average Tree Diameter (Inches)	5.9	3.4
Average Tree Height (Feet)	25	23
Total Number of Conifers Measured	90	7
Total Number of Conifers Released	78	6
Total Number of Alders Thinned	94	
Upper Mainstem Ah Pah Creek		
	Coastal Redwood	Douglas Fir
Average Tree Diameter (Inches)	6.6	4.7
Average Tree Height (Feet)	28	26
Total Number of Conifers Measured	62	8
Total Number of Conifers Released	50	7
Total Number of Alders Thinned	92	
South Fork Ah Pah Creek		
	Coastal Redwood	Douglas Fir
Average Tree Diameter (Inches)	5.7	3.9
Average Tree Height (Feet)	29	28
Total Number of Conifers Measured	31	50
Total Number of Conifers Released	28	47
Total Number of Alders Thinned	125	

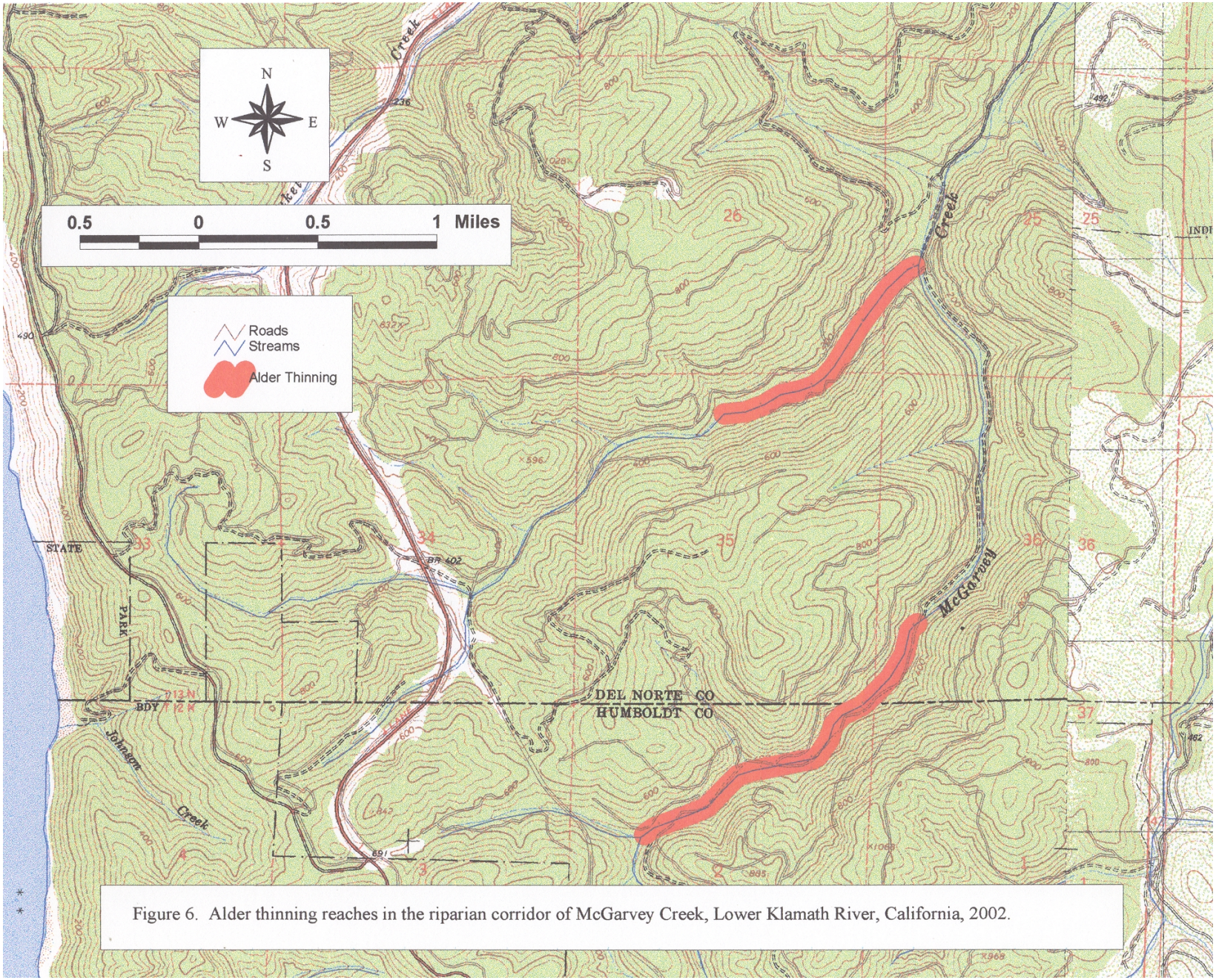

Figure 6. Alder thinning reaches in the riparian corridor of McGarvey Creek, Lower Klamath River, California, 2002.

Table 3. Summary of conifers released and alders thinned, mainstem McGarvey Creek, lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
149	RW	75	8.9	60	10
149	RW	80	3.2	20	"
149	RW	81	4.1	25	"
149	RW	40	1.6	9	"
149	RW	40	2.9	12	"
149	RW	25	3.2	14	"
149	RW	30	2.9	12	"
149	RW	40	3.8	17	"
149	RW	45	1.4	10	"
149	RW	35	2.2	12	"
149	RW	40	2.2	10	"
149	RW	42	6.7	35	"
149	RW	42	2.2	10	"
149	RW	42	5.4	25	"
149	RW	42	7.0	35	"
149	RW	42	2.5	10	"
149	RW	42	1.9	9	"
149	RW	42	3.2	15	"
149	RW	42	2.9	12	"
149	RW	42	7.3	40	"
149	RW	42	2.5	15	"
149	RW	42	2.2	9	"
149	RW	42	2.9	12	"
149	RW	42	2.2	10	"
150	RW	20	12.1	60	9
150	RW	18	10.5	50	"
150	RW	21	7.6	45	"
150	RW	23	8.3	45	"
150	RW	25	4.3	20	"
150	RW	21	8.6	45	"
151	RW	25	3.5	20	No Cut
152	RW	15	3.2	15	10
152	RW	20	3.8	15	"
152	RW	21	4.5	20	"
152	RW	22	5.4	25	"
152	RW	40	2.2	15	"
152	RW	35	7.3	20	"
152	RW	35	5.4	15	"

Table 3 (Cont). Summary of conifers released and alders thinned, mainstem McGarvey Creek, lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
153	RW	40	8.6	50	5
153	RW	42	8.0	50	"
153	RW	44	8.6	50	"
153	RW	46	6.7	45	"
154	RW	45	7.6	40	6
154	RW	45	6.0	35	"
154	RW	45	7.3	35	"
154	RW	45	7.3	30	"
155	RW	50	5.7	20	5
155	RW	50	7.3	25	"
155	RW	50	8.3	30	"
155	RW	50	8.3	30	"
155	RW	50	7.0	25	"
156	DF	15	4.8	30	No Cut
156	DF	15	2.5	15	"
156	RW	15	1.6	10	"
156	DF	15	1.9	10	"
157	DF	25	7.6	40	12
157	DF	25	2.4	15	"
157	DF	25	2.4	15	"
157	DF	25	1.6	10	"
157	RW	25	6.7	35	"
157	RW	25	5.4	30	"
157	RW	25	2.4	15	"
157	RW	25	1.8	15	"
157	DF	25	1.3	8	"
158	RW	70	12.7	90	11
158	RW	70	7.3	80	"
158	RW	70	6.4	80	"
158	RW	70	11.5	90	"
158	RW	70	7.6	80	"
158	RW	70	5.4	50	"
158	RW	70	13.1	90	"
158	RW	70	10.8	90	"
159	DF	50	2.5	25	4
159	DF	50	2.9	20	"
160	RW	30	3.3	20	3

Table 3 (Cont). Summary of conifers released and alders thinned, mainstem McGarvey Creek, lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
161	DF	30	8.0	70	7
161	DF	30	4.1	50	"
161	DF	30	4.8	45	"
161	DF	35	4.1	40	"
161	DF	30	3.8	25	"
162	RW	60	4.1	15	No Cut
163	RW	60	2.4	15	4
163	RW	60	1.9	10	"
163	RW	60	2.2	15	"
164	RW	90	3.8	25	6
164	RW	95	2.5	20	"
165	DF	55	5.7	30	7
165	DF	50		20	"
165	RW	50		20	"
165	RW	53		10	"
166	DF	60	1.9	10	2
167	DF	20	1.6	10	2
167	DF	20	1.3	8	"
167	DF	23	0.6	6	"
168	DF	15	2.4	15	2
169	RW	75	4.1	25	3
169	RW	75	4.1	15	"

Table 4. Summary of conifers released and alders thinned, West Fork McGarvey Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
102	DF	75	5.1	40	3
103	DF	65	4.5	25	2
104	RW	40	14.3	50	6
104	RW	40	4.0	18	"
104	RW	40	5.3	22	"
105	RW	40	9.9	50	5
105	RW	40	12.1	50	"
105	RW	40	15.9	50	"
105	RW	40	12.7	50	"
105	RW	40	10.2	50	"
105	RW	40	7.3	30	"
105	RW	40	3.5	18	"
105	RW	40	15.6	50	"
106	RW	50	6.4	30	1
106	RW	50	2.2	15	"
106	RW	50	3.2	20	"
106	RW	50	3.5	20	"
106	RW	50	7.6	50	"
106	RW	50	2.9	18	"
107	RW	30	1.9	15	No Cut
108	DF	100	2.4	20	3
108	RW	100	4.5	20	"
109	RW	75-100	5.1	20	9
109	RW	75-100	4.6	25	"
109	RW	75-100	2.5	20	"
109	RW	75-100	5.1	20	"
109	DF	75-100	2.2	15	"
110	RW	25	6.7	30	7
110	RW	25	14.3	70	"
110	RW	25	3.5	18	"
110	RW	25	7.6	30	"
110	RW	25	7.0	30	"
111	RW	70	3.8	15	No Cut
112	RW	90	6.7		7
112	RW	90	2.9	14	"
112	RW	90	1.8	13	"
112	RW	90	3.8	18	"
112	RW	90	2.5	14	"
112	RW	90	2.8	10	"

Table 4 (Cont). Summary of conifers released and alders thinned, West Fork McGarvey Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
113	RW	20	3.8	10	4
113	RW	20	3.0	15	"
113	RW	20	2.5	16	"
113	RW	20	3.5	14	"
113	RW	20	3.2	17	"
114	DF	50	2.5	17	5
115	RW	85	4.0	25	6
116	RW	100	5.7	38	No Cut
116	DF	100	3.2	22	"
117	DF	75	3.8	22	4
118	RW	50	5.4	40	4
118	RW	50	2.7	14	"
118	RW	50	2.5	14	"
118	RW	50	3.7	28	"
118	RW	50	2.4	18	"
118	RW	50	3.0	20	"
118	RW	50	1.4	13	"
118	RW	50	1.6	15	"
118	RW	50	3.5	25	"
118	RW	50	1.8	15	"
119	RW	30	13.1	90-100	4
119	RW	30	9.2	40-50	"
119	RW	30	8.0	40-50	"
119	RW	30	8.3	60	"
119	RW	30	12.7	80-90	"
120	RW	60	13.4	90-100	4
120	RW	60	8.9	90-100	"
120	RW	60	4.1	40-60	"
120	RW	60	4.5	40-60	"
120	RW	60	6.4	60-70	"
121	RW	20	11.1	45-50	No Cut
122	RW	50	8.9	35	3
122	RW	50	2.9	12	"
122	RW	50	4.8	15	"
123	RW	55	10.2	45	4
123	RW	55	6.7	27	"

Table 4 (Cont). Summary of conifers released and alders thinned, West Fork McGarvey Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
124	RW	90	11.5	50	4
124	RW	90	2.5	14	"
124	RW	90	2.9	12	"
124	RW	90	8.9	20	"
124	RW	90	5.7	18	"
125	RW	100	3.8	20	2
125	RW	100	3.5	18	"
126	RW	100	3.2	12	No Cut
126	RW	100	2.2	10	"
126	RW	100	2.5	10	"
127	RW	30	8.6	30	No Cut
127	RW	30	6.7	33	"
127	RW	30	5.4	15	"
127	RW	30	2.9	12	"
127	RW	30	5.4	28	"
128	RW	70	8.9	50	5
128	RW	70	3.8	15	"
128	RW	70	6.7	38-40	"
128	RW	70	6.4	35-40	"
128	RW	70	6.4	30	"
128	RW	70	6.0	25	"
129	RW	90	6.4	20	2

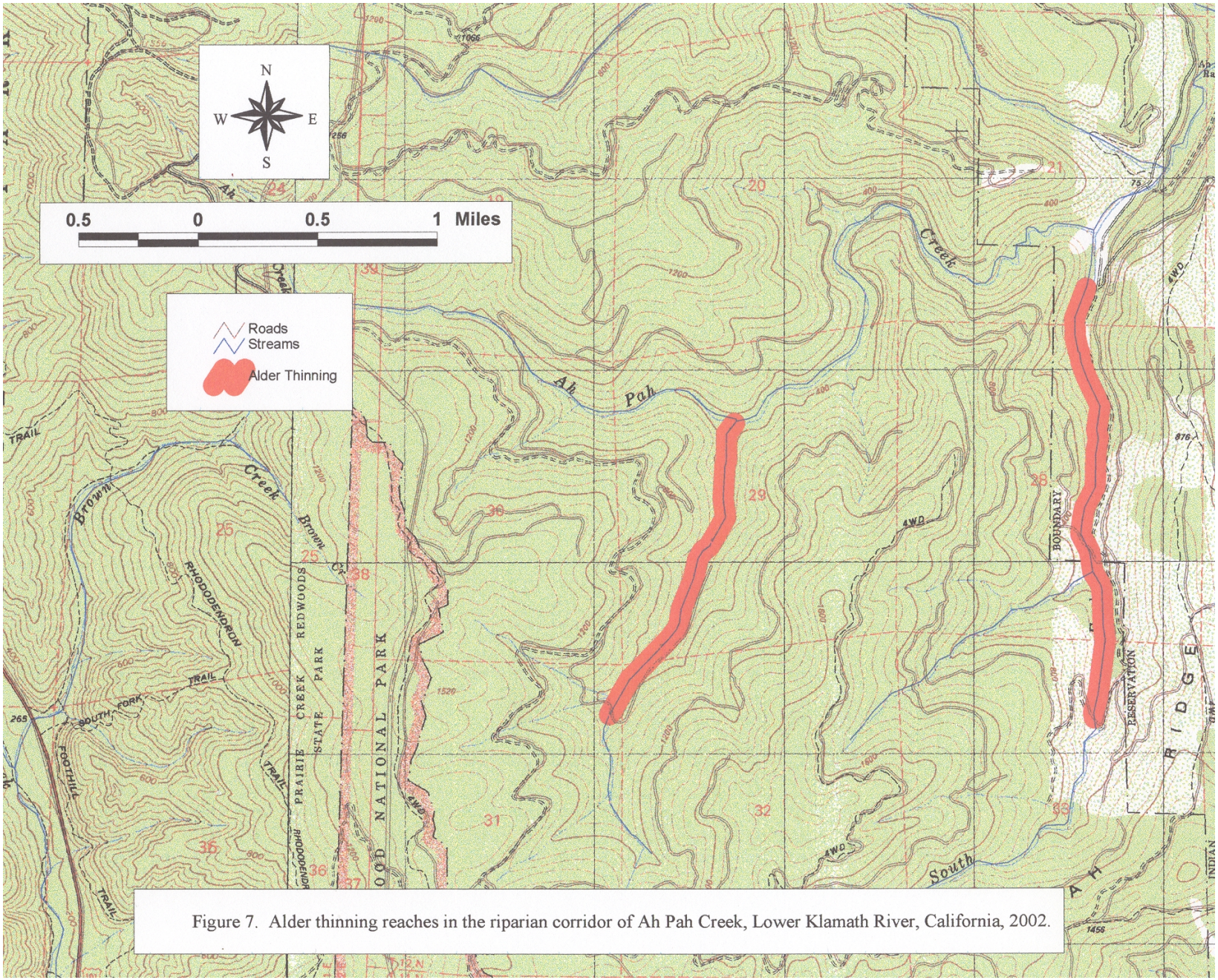

Figure 7. Alder thinning reaches in the riparian corridor of Ah Pah Creek, Lower Klamath River, California, 2002.

Table 5. Summary of conifers released and alders thinned, Upper Ah Pah Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
170	RW	75	5.9	25	10
170	RW	75	7.3	35	"
170	DF	75	2.9	15	"
170	RW	75	7.3	35	"
171	RW	50	14.0	50	10
171	RW	48	10.8	45	"
171	RW	45	5.7	30	"
171	RW	40	6.0	25	"
171	RW	41	5.3	20	"
172	RW	100	2.1	10	7
172	RW	90	1.6	10	"
172	RW	88	1.3	8	"
172	RW	90	11.1	50	"
172	RW	94	8.6	30	"
172	RW	95	2.5	15	"
172	RW	100	3.5	25	"
173	RW	75	6.4	40	5
173	RW	75	1.6	8	"
174	RW	75	10.5	30	No Cut
174	RW	75	8.8	35	"
174	RW	75	9.2	45	"
175	DF	50	3.8	20	3
176	RW	50	7.3	25	2
177	DF	80	10.2	60	6
177	RW	85	4.9	20	"
177	RW	80	7.0	30	"
177	RW	75	1.9	10	"
177	RW	70	3.0	15	"
177	RW	75	2.5	15	"
178	RW	75	7.3	20	7
178	RW	75	2.7	15	"
178	RW	65	2.2	8	"
178	RW	65	4.1	20	"
178	RW	75	1.9	7	"

Table 5 Cont). Summary of conifers released and alders thinned, Upper Ah Pah Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
179	RW	75	5.1	25	No Cut
179	RW	75	4.1	15	"
179	RW	75	1.9	10	"
179	DF	75	1.6	10	"
179	RW	75	9.5	30	"
179	RW	75	8.6	30	"
179	RW	75	11.8	50	"
179	RW	75	6.4	25	"
180	DF	75	6.4	30	6
180	DF	75	2.5	15	"
180	RW	75	5.4	20	"
180	DF	75	4.1	25	"
181	RW	90	5.7	25	7
181	RW	90	8.0	35	"
181	RW	90	5.4	30	"
182	DF	75	5.9	30	5
183	RW	75	9.2	40	2
183	RW	65	4.5	20	"
184	RW	80	13.1	50	5
184	RW	80	8.6	30	"
184	RW	80	5.4	30	"
184	RW	80	5.7	30	"
184	RW	80	22.9	45	"
185	RW	50	6.0	15	5
185	RW	50	2.5	10	"
185	RW	45	4.5	15	"
186	RW	15	7.5	35	No Cut
186	RW	15	6.0	35	"
187	RW	40	9.9	50	6
187	RW	30	7.6	40	"
187	RW	30	7.3	40	"
188	RW	20	11.1	50	5
188	RW	15	4.6	30	"
188	RW	15	6.4	20	"
188	RW	15	6.4	20	"
189	RW	20	15.9	50	1

Table 6. Summary of conifers released and alders thinned, South Fork Ah Pah Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
130	RW	25	8.3	50	12
130	RW	40	4.5	15	"
130	RW	35	6.4	20	"
130	RW	32	4.5	18	"
130	RW	32	7.0	20	"
130	RW	33	5.4	22	"
131	RW	90	14.3	70	8
131	DF	90	3.2	20	"
132	DF	70	6.7	30	5
133	DF	35	2.9	20	7
133	DF	35	1.9	15	"
134	RW	18	9.9	45	No Cut
134	RW	18	8.6	50	"
135	RW	30	6.4	30	6
136	DF	30	4.1	45	5
137	DF	25	2.9	15	2
137	DF	25	1.6	13	"
138	RW	40-50	13.7	50	11
138	RW	40-50	6.0	35	"
138	DF	40-50	6.5	55	"
138	DF	40-50	3.2	25	"
138	RW	40-50	3.5	25	"
138	RW	40-50	2.2	20	"
138	RW	40-50	4.0	25	"
138	DF	40-50	6.4	50	"
138	RW	40-50	2.1	15	"
138	DF	40-50	3.5	20	"
139	DF	20	2.9	20	4
140	DF	25	11.8	80	4
140	DF	25	12.1	80	
141	DF	20-25	8.0	50	No Cut
141	DF	20-25	7.6	50	"
141	DF	20-25	4.1	45	"
142	RW	20	2.9	20	3
143	RW	20	7.6	40	9
143	RW	20	3.2	15	"
143	RW	20	5.4	35	"
143	RW	20	3.8	20	"

Table 6 (Cont). Summary of conifers released and alders thinned, South Fork Ah Pah Creek, Lower Klamath River, California, 2002.

Tag Number	Tree Species	Distance from Creek (Feet)	Tree Diameter (Inches)	Tree Height (Feet)	Number of Alders Thinned
144	RW	25	7.6	30	3
145	RW	50	8.0	50	6
146	RW	25	7.0	25	No Cut
147	RW	25	5.1	40	23
147	DF	26	3.2	25	"
147	DF	23	3.7	30	"
147	RW	20	3.2	20	"
147	DF	20	2.9	15	"
147	DF	28	2.5	15	"
147	RW	50	2.5	20	"
147	DF	50	1.9	10	"
147	DF	75	6.7	50	"
147	DF	77	2.5	25	"
147	DF	80	3.8	25	"
147	DF	83	3.8	30	"
147	DF	85	4.8	30	"
147	DF	79	3.2	25	"
147	DF	75	3.2	25	"
147	DF	80	4.1	25	"
147	DF	75	4.1	25	"
147	DF	72	2.5	25	"
147	DF	60	3.2	25	"
147	RW	58	4.1	20	"
147	DF	53	2.5	20	"
147	DF	50	3.8	30	"
147	DF	52	2.9	25	"
147	DF	40	4.5	35	"
147	RW	38	5.3	20	"
147	DF	38	2.2	15	"
147	DF	37	4.8	35	"
147	DF	37	5.1	30	"
148	DF	30	2.7	15	17
148	DF	35	2.1	12	"
148	RW	40	1.6	10	"
148	RW	60	2.2	10	"
148	DF	68	3.8	50	"
148	DF	66	1.9	10	"
148	DF	65	1.6	8	"
148	DF	67	3.2	20	"
148	DF	75	1.9	10	"
148	DF	80	3.2	18	"
148	DF	78	2.1	12	"
148	DF	65	1.9	15	"

Figure 8. YTFP crewmember planting bareroot conifers on decommissioned M-10 road, McGarvey Creek, lower Klamath River, California, 2002.

Figure 9. Coastal redwood tree two years after planting, decommissioned M-10 road, McGarvey Creek, lower Klamath River, California, 2003.

Figure 10. YTFP crewmember thinning alders to release adjacent conifer trees, West Fork McGarvey Creek, lower Klamath River, California, 2002.

Figure 11. YTFP crewmember thinning alders to release adjacent conifer trees, West Fork McGarvey Creek, lower Klamath River, California, 2002.

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