
Appendix A

Empire Project Maps

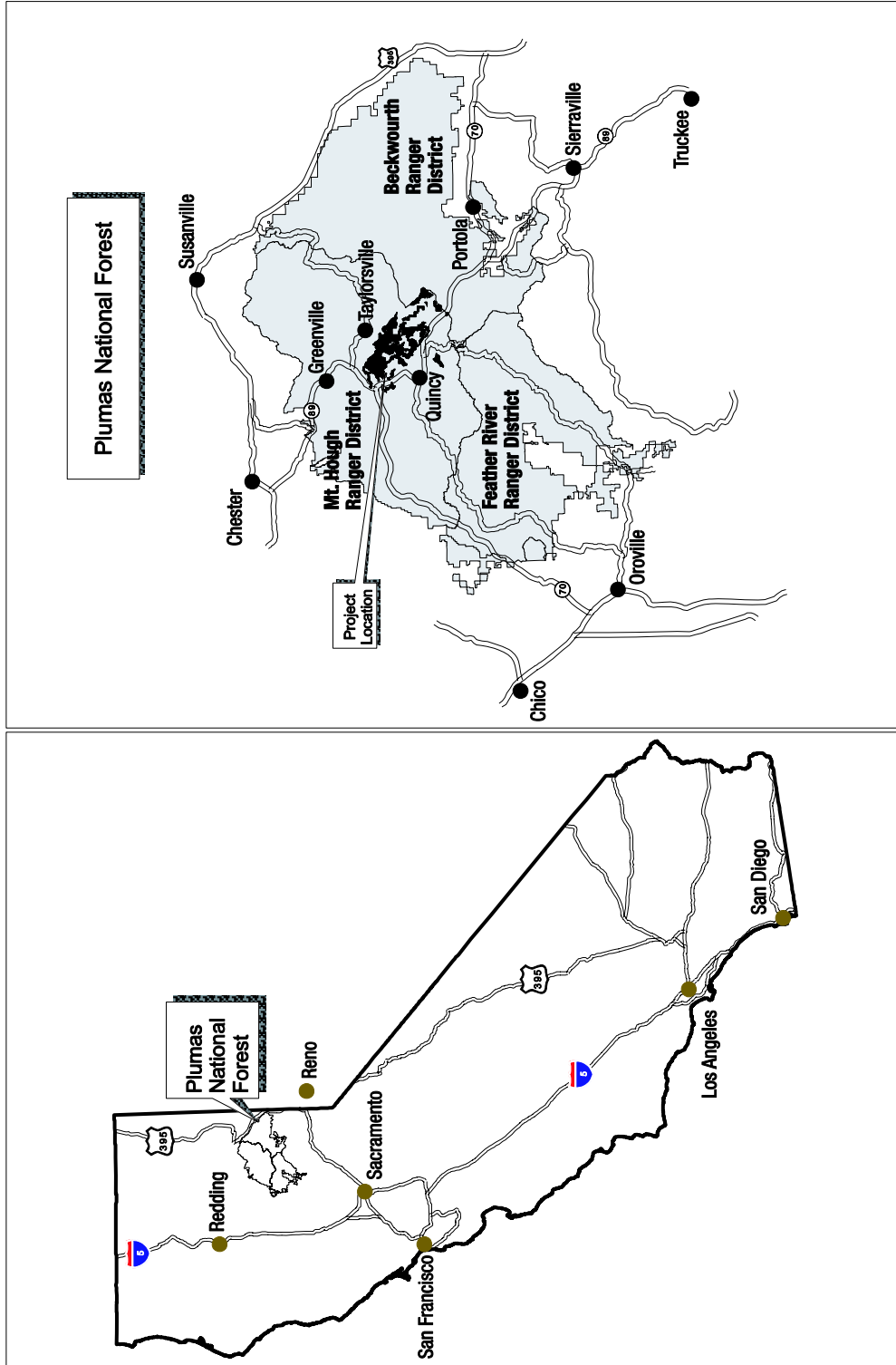
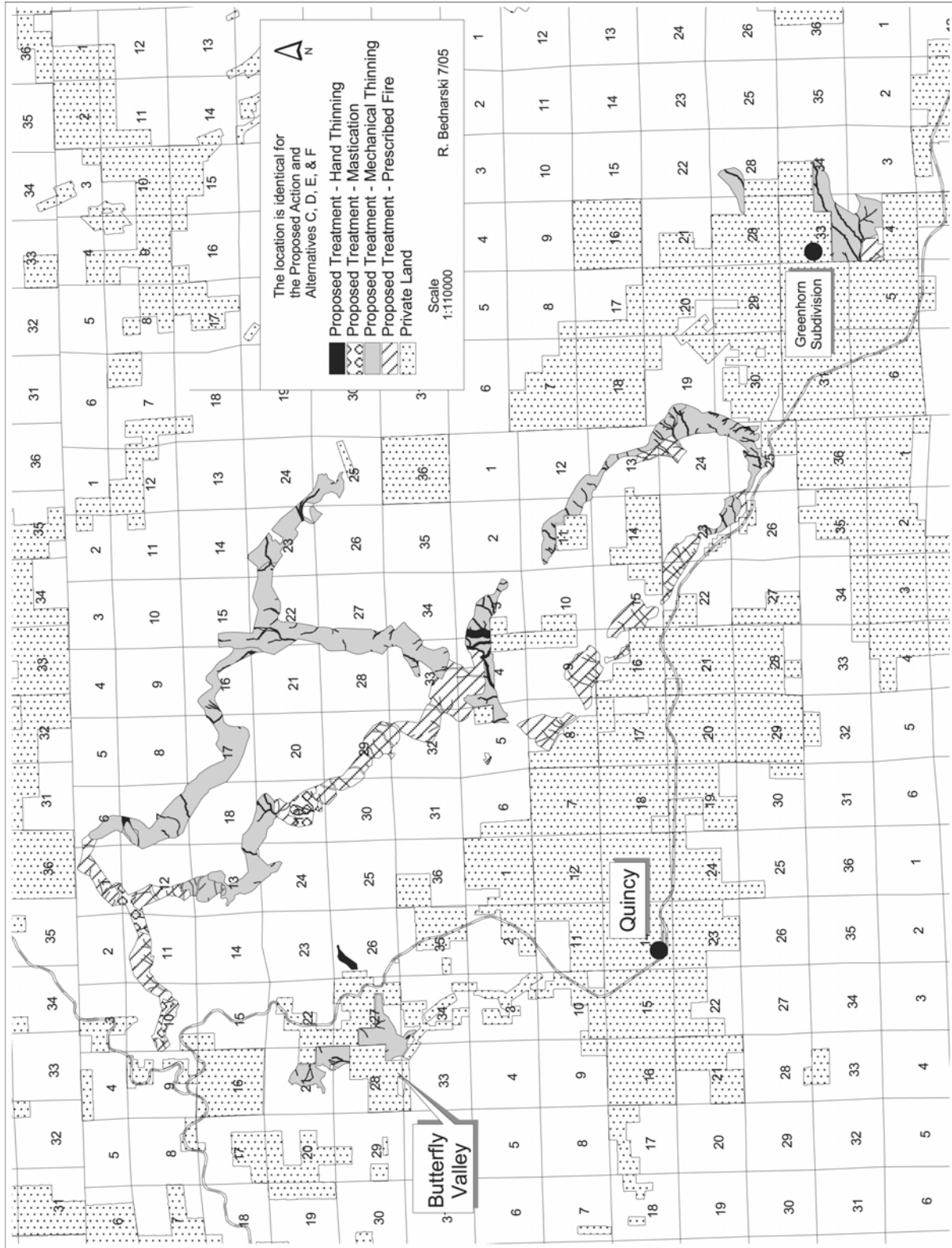


Figure A-1. Empire Vegetation Management Project vicinity map.



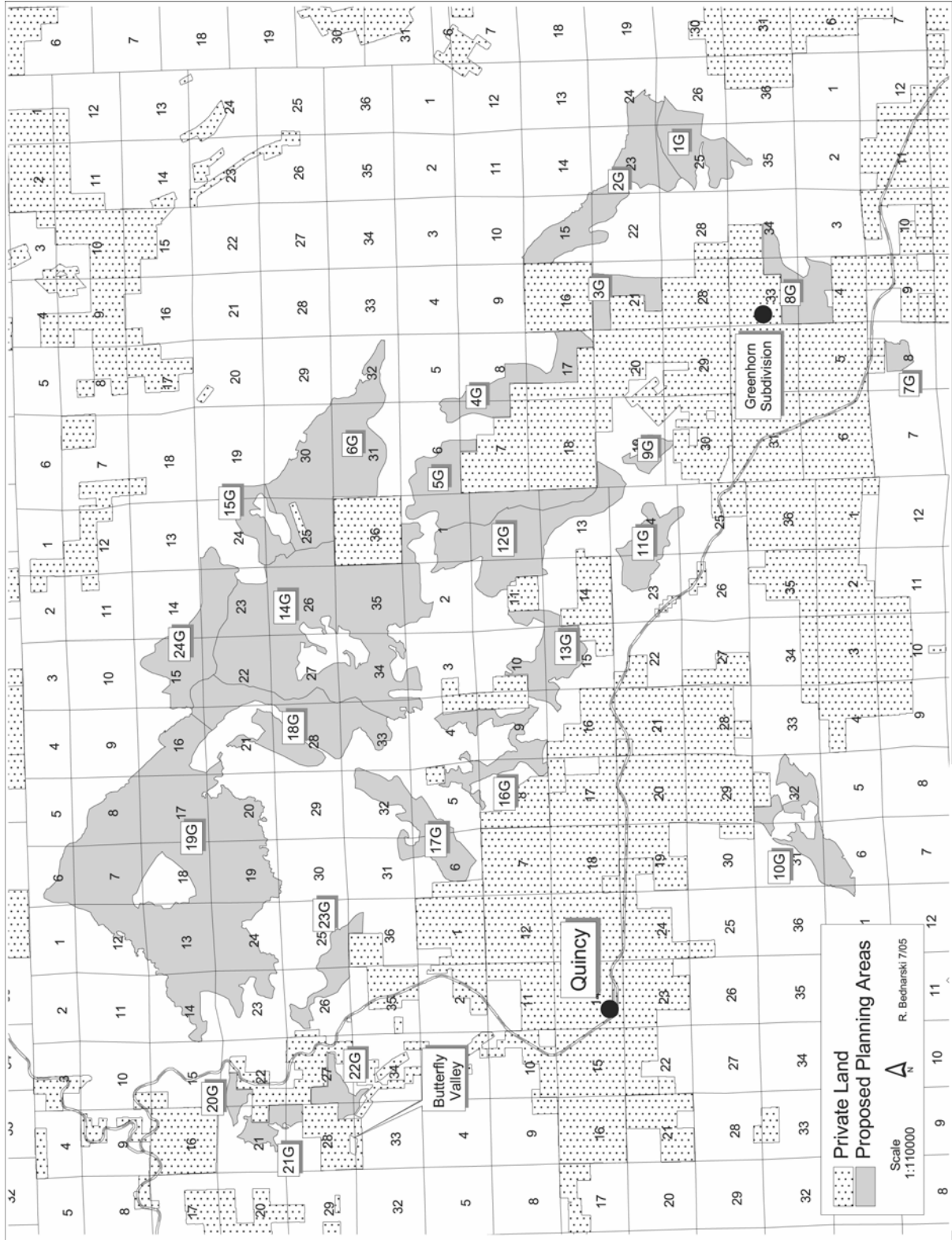


Figure A-3. Proposed Planning Areas

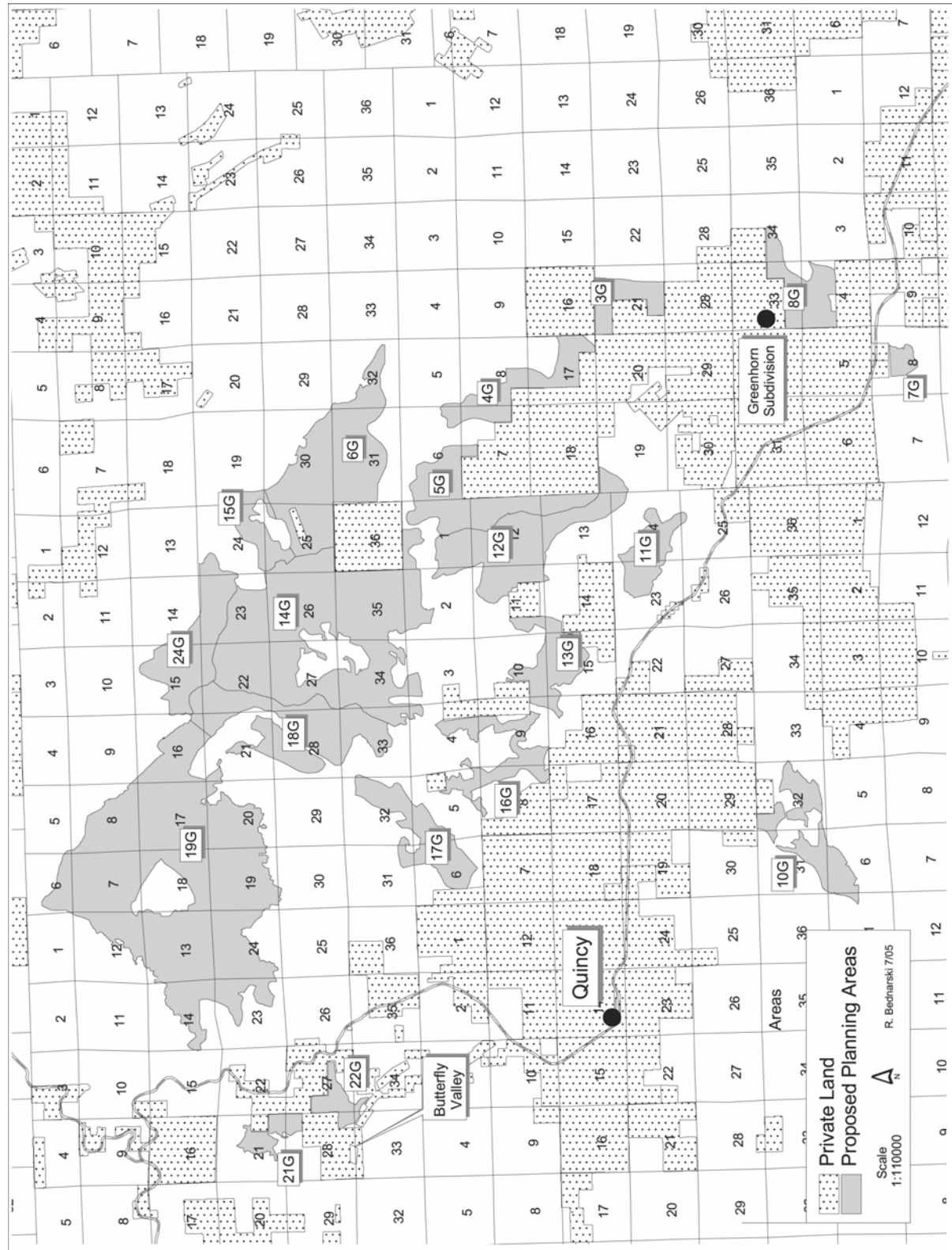
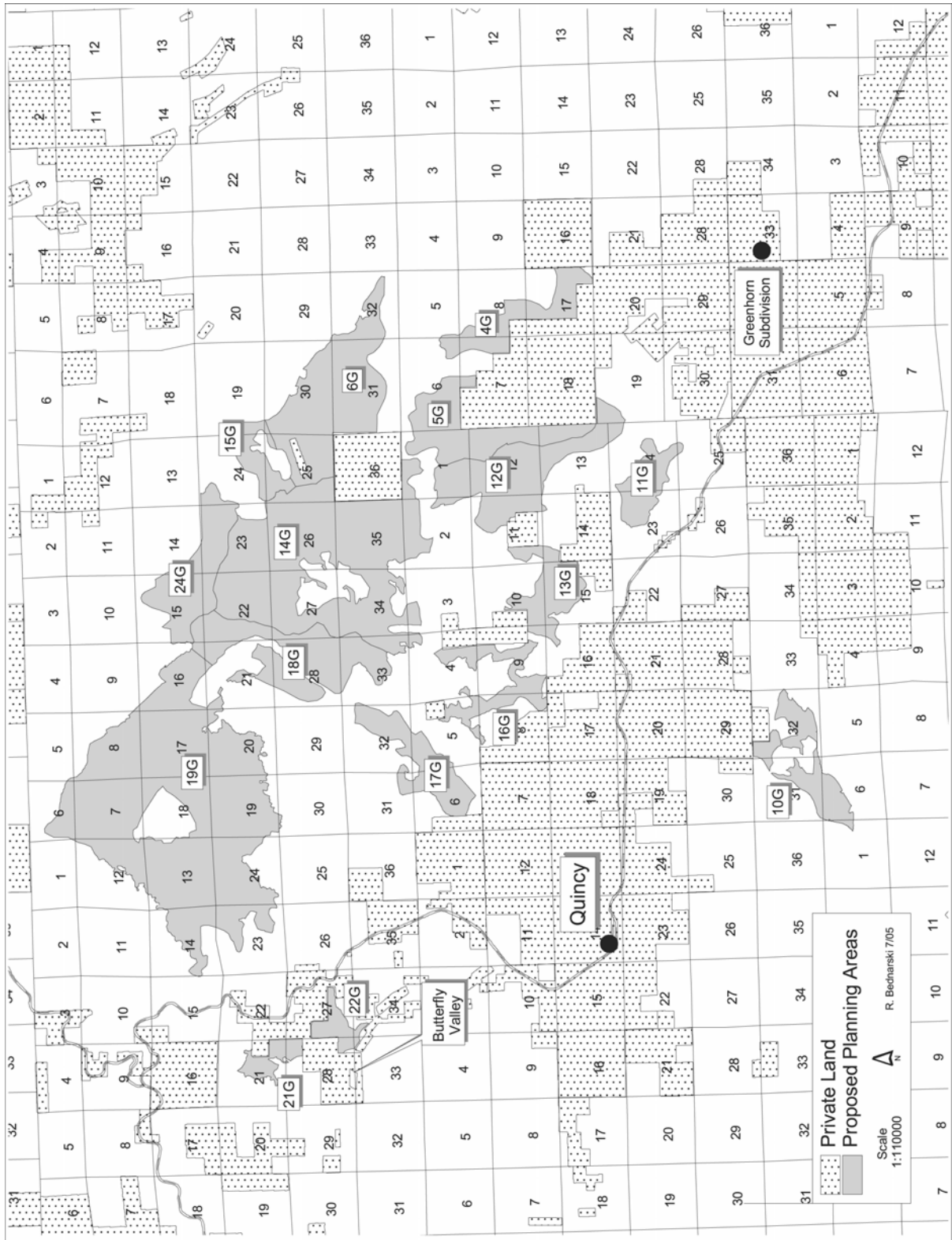


Figure A-4. Proposed planning areas, alternative C.



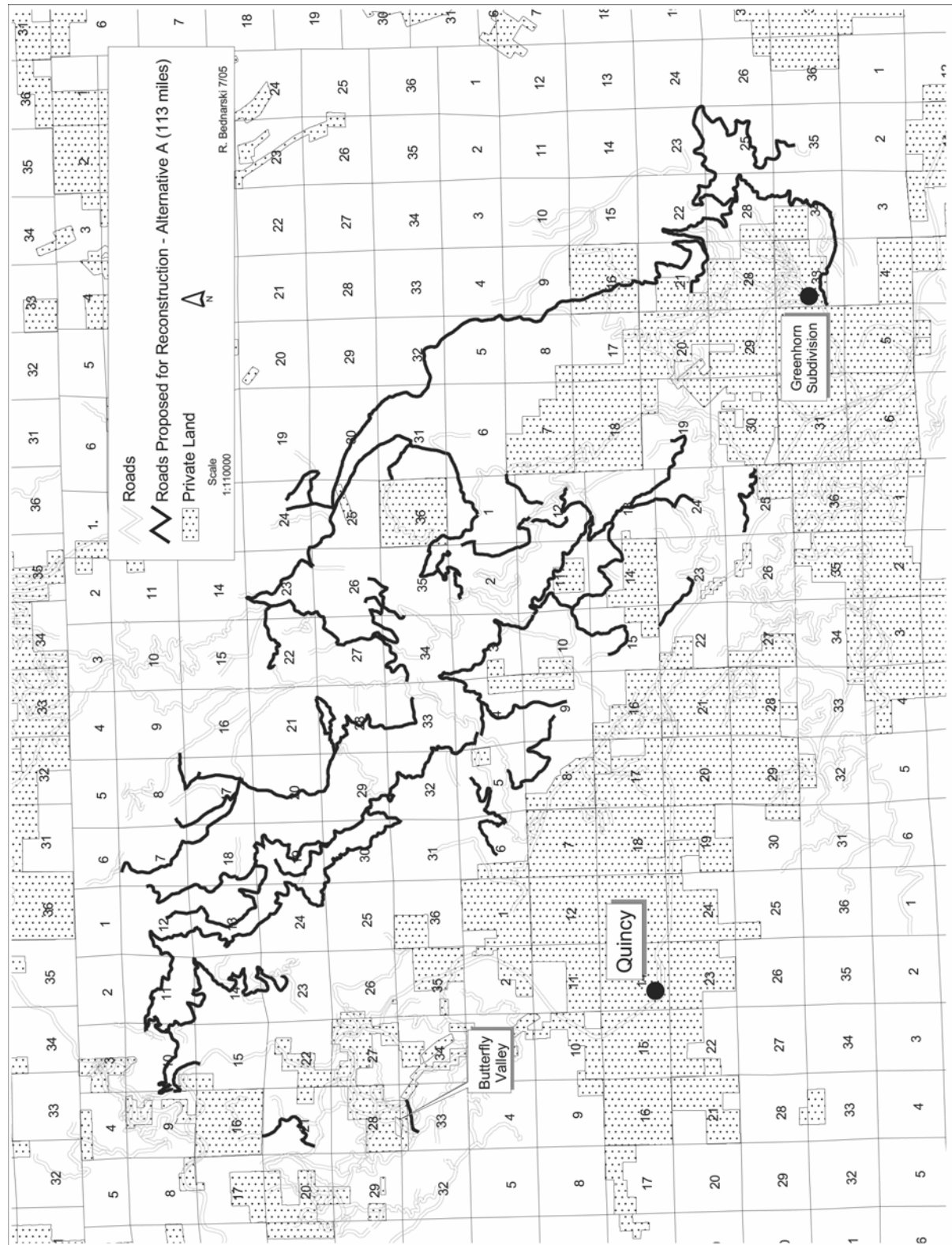
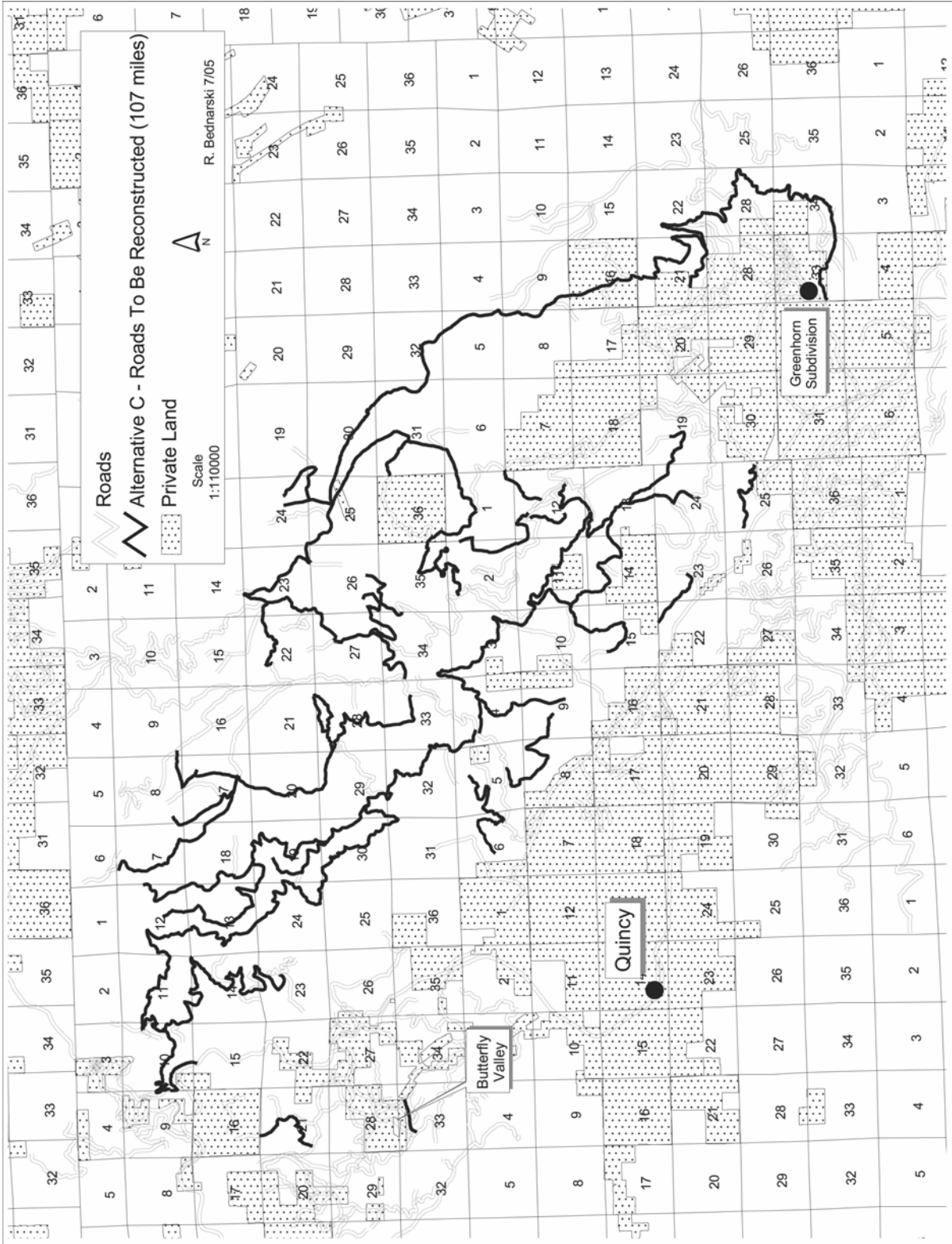
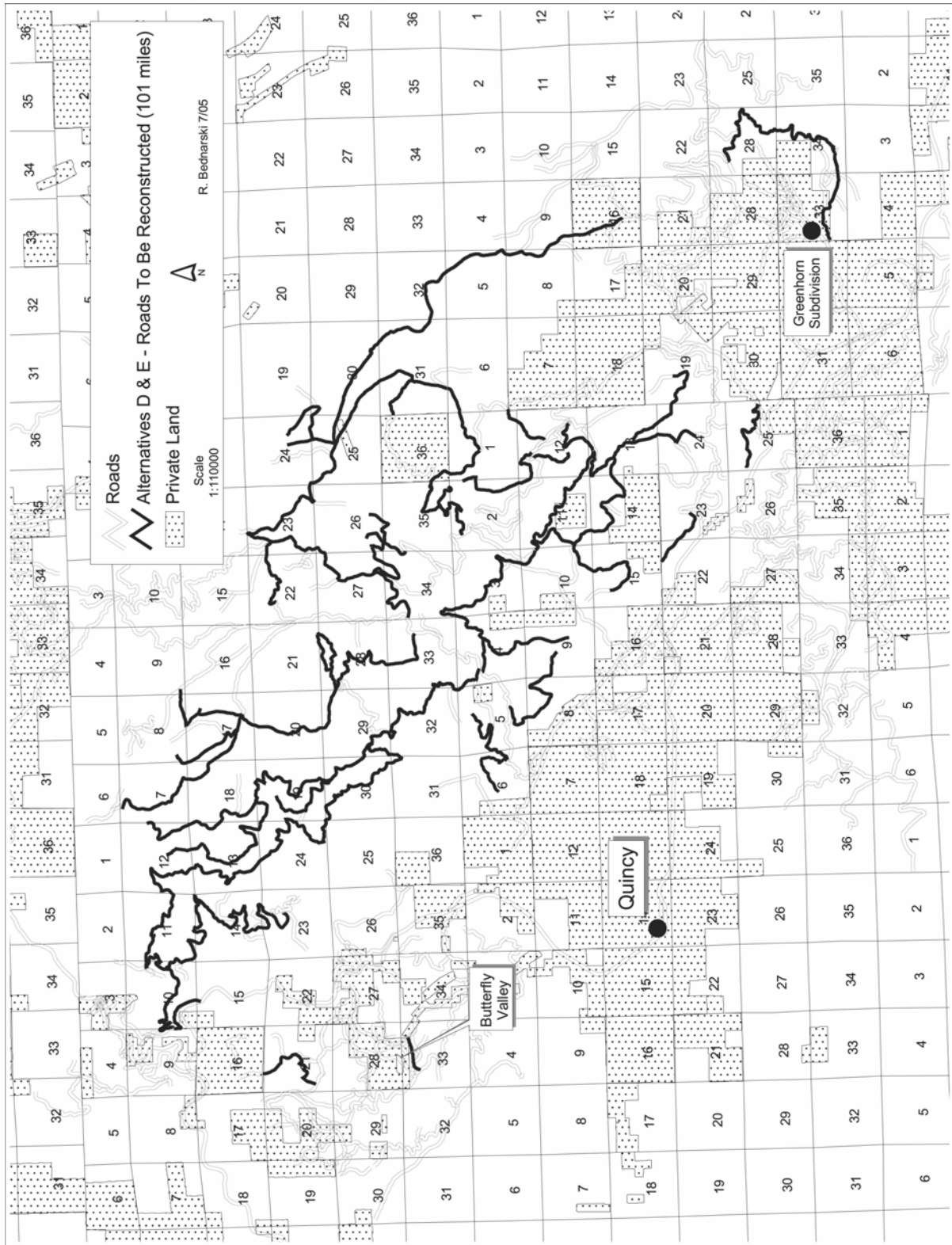
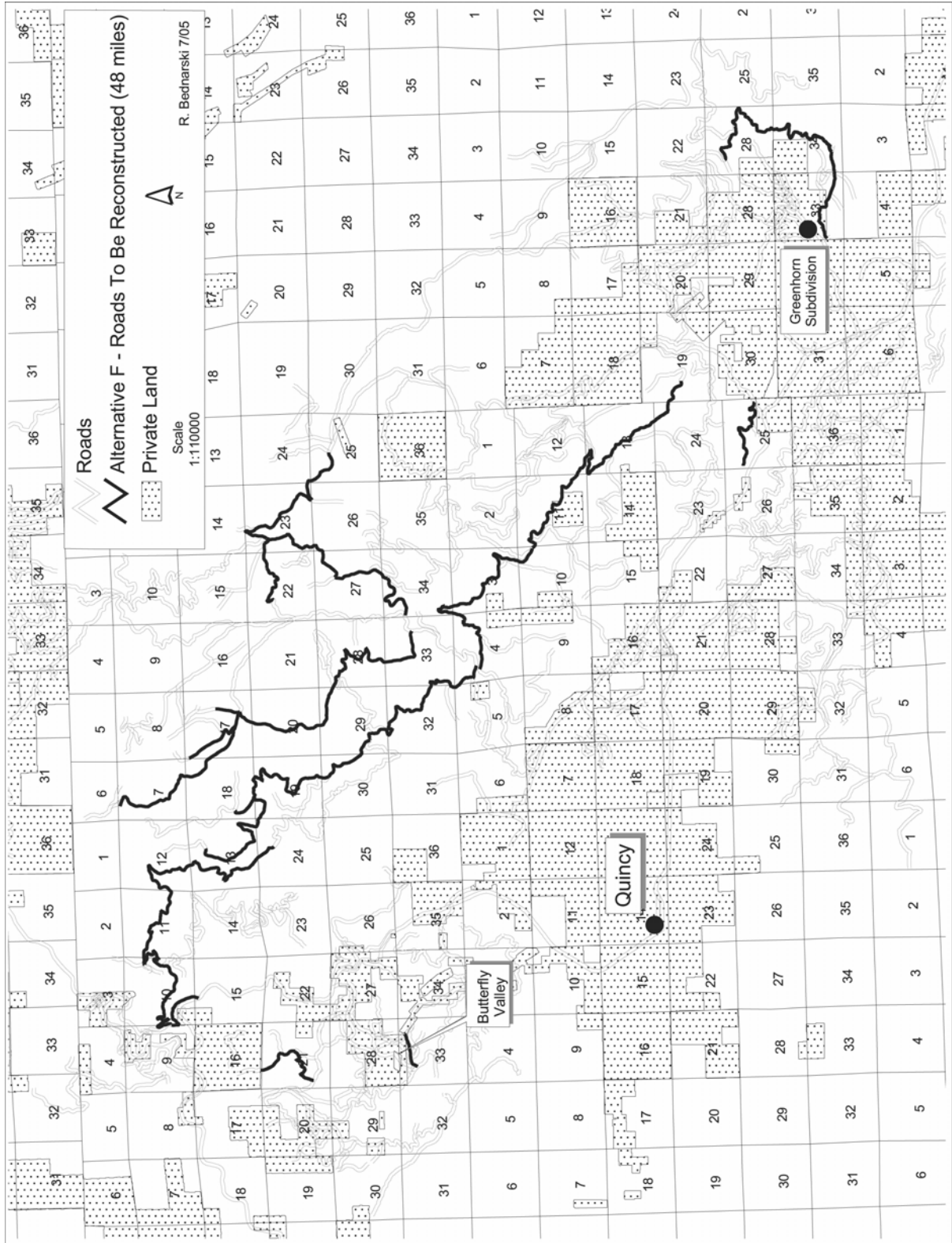
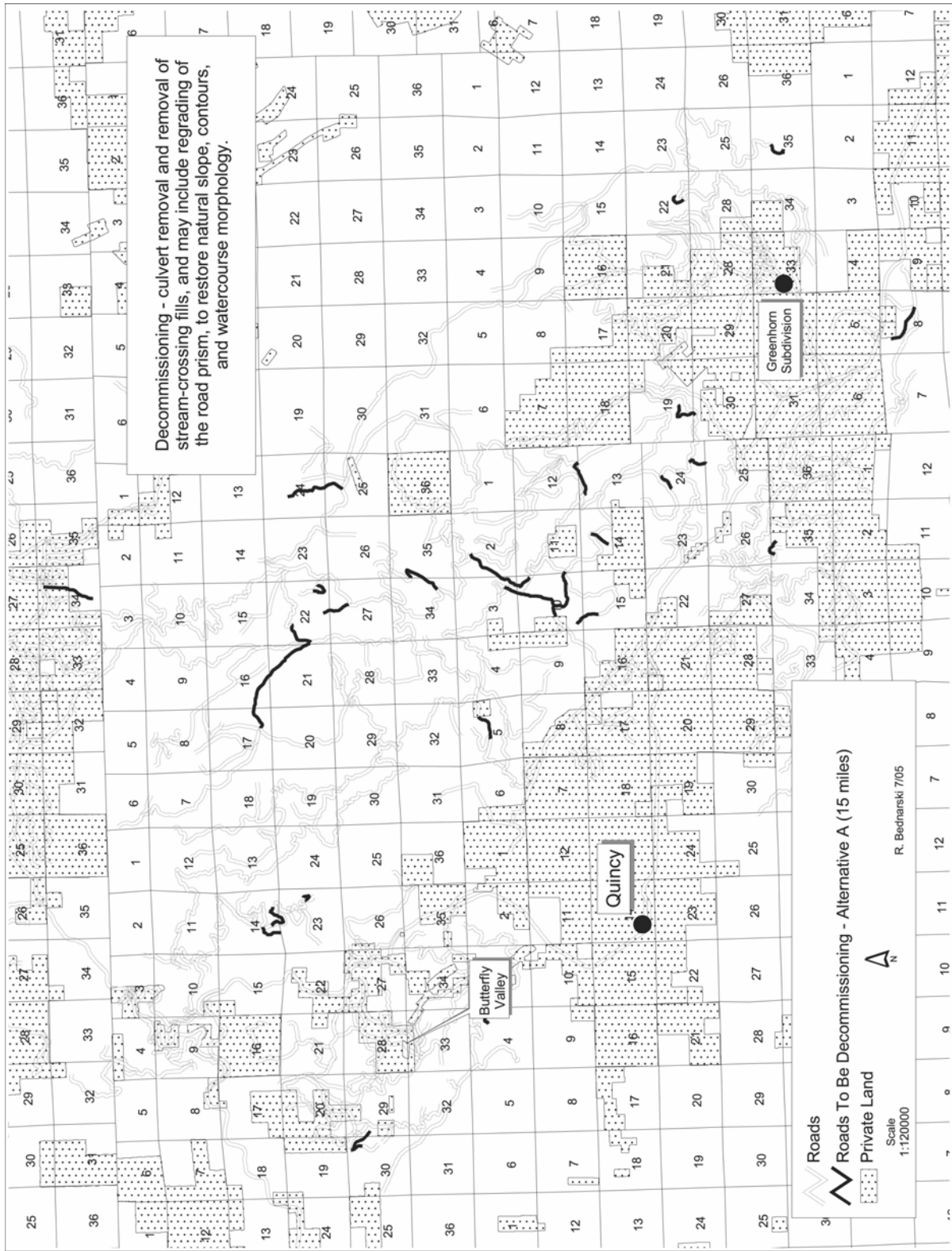


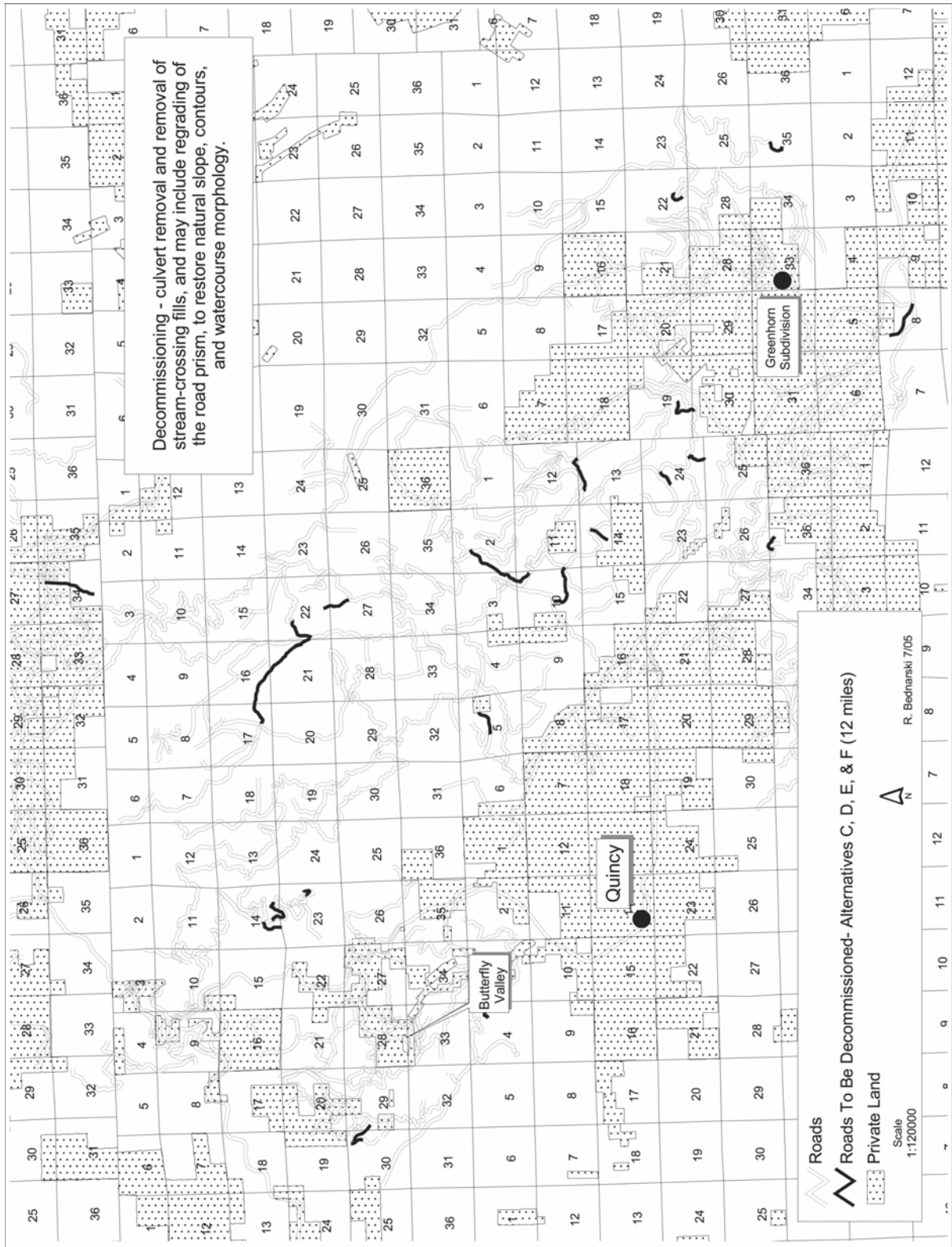
Figure A-6. Proposed action — road reconstruction. (The map is so small in scale that the road numbers would be illegible. Larger maps are available upon request.)

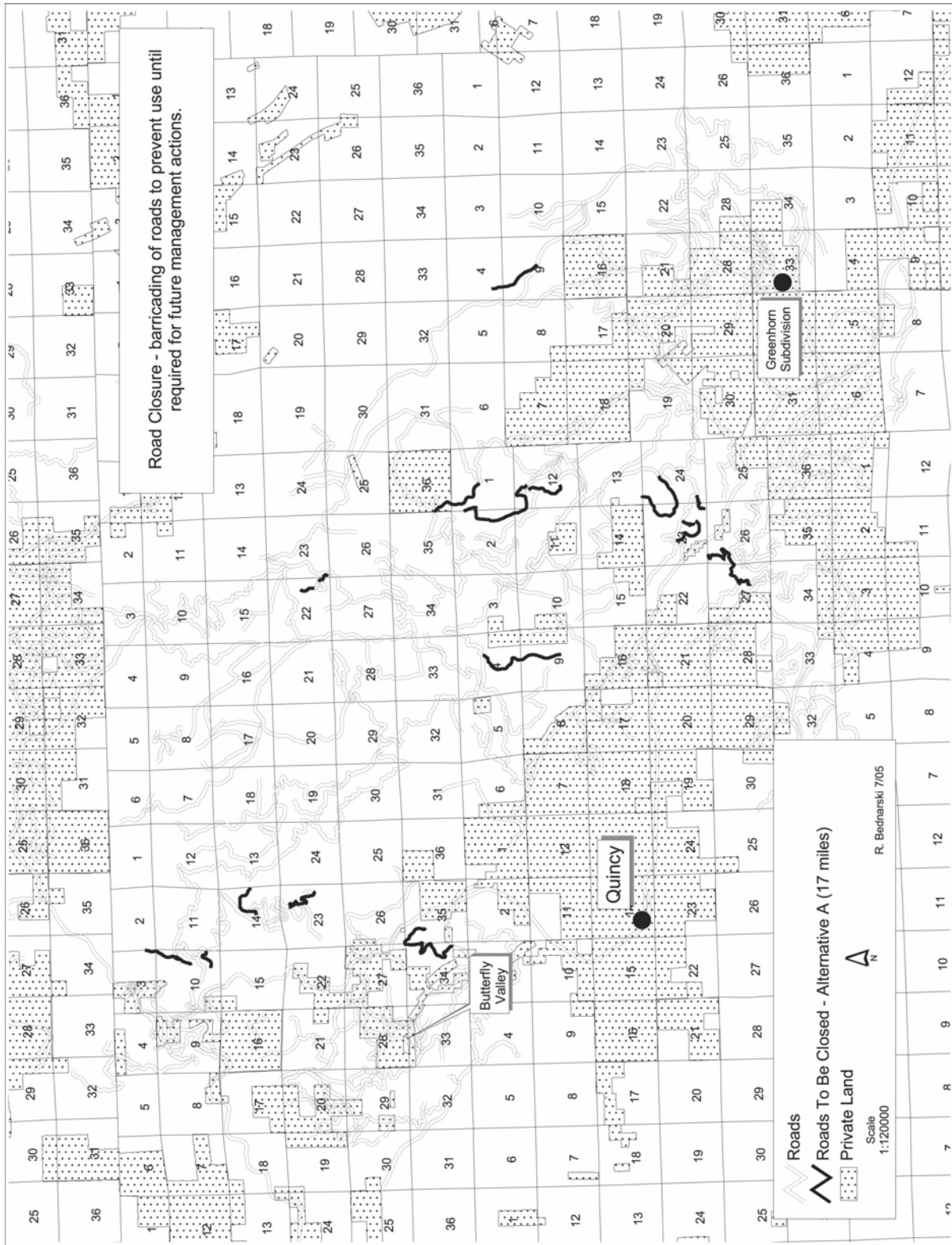


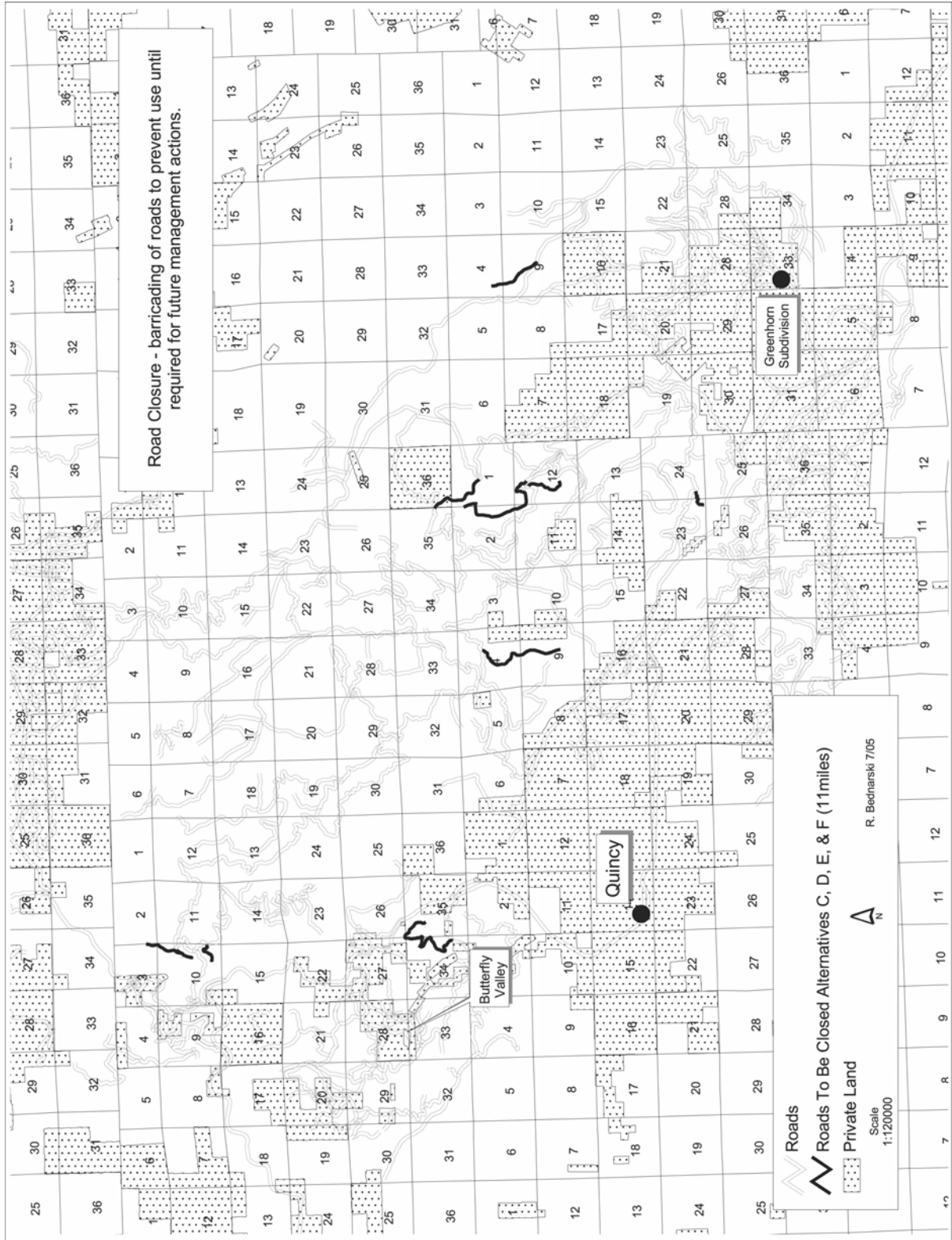


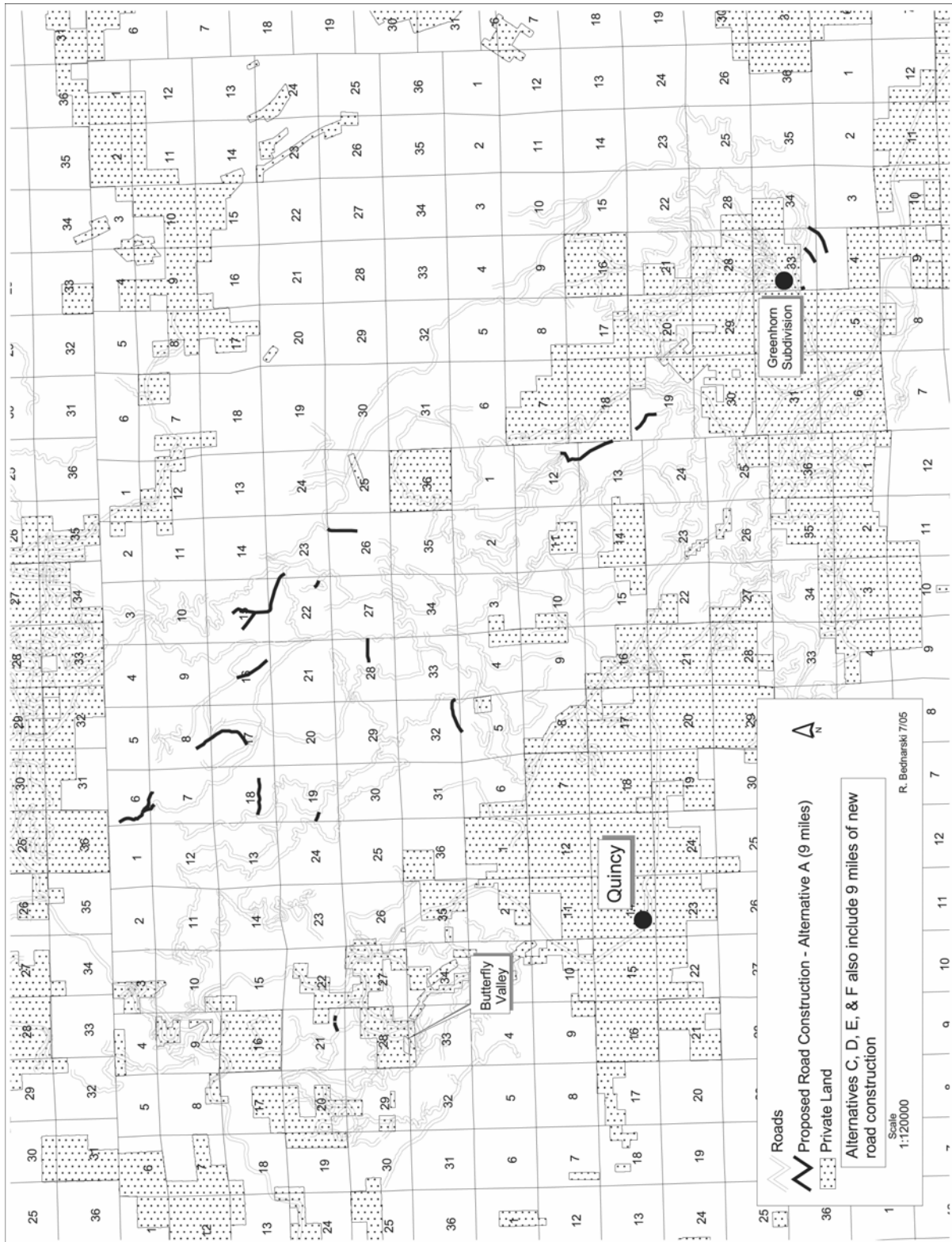


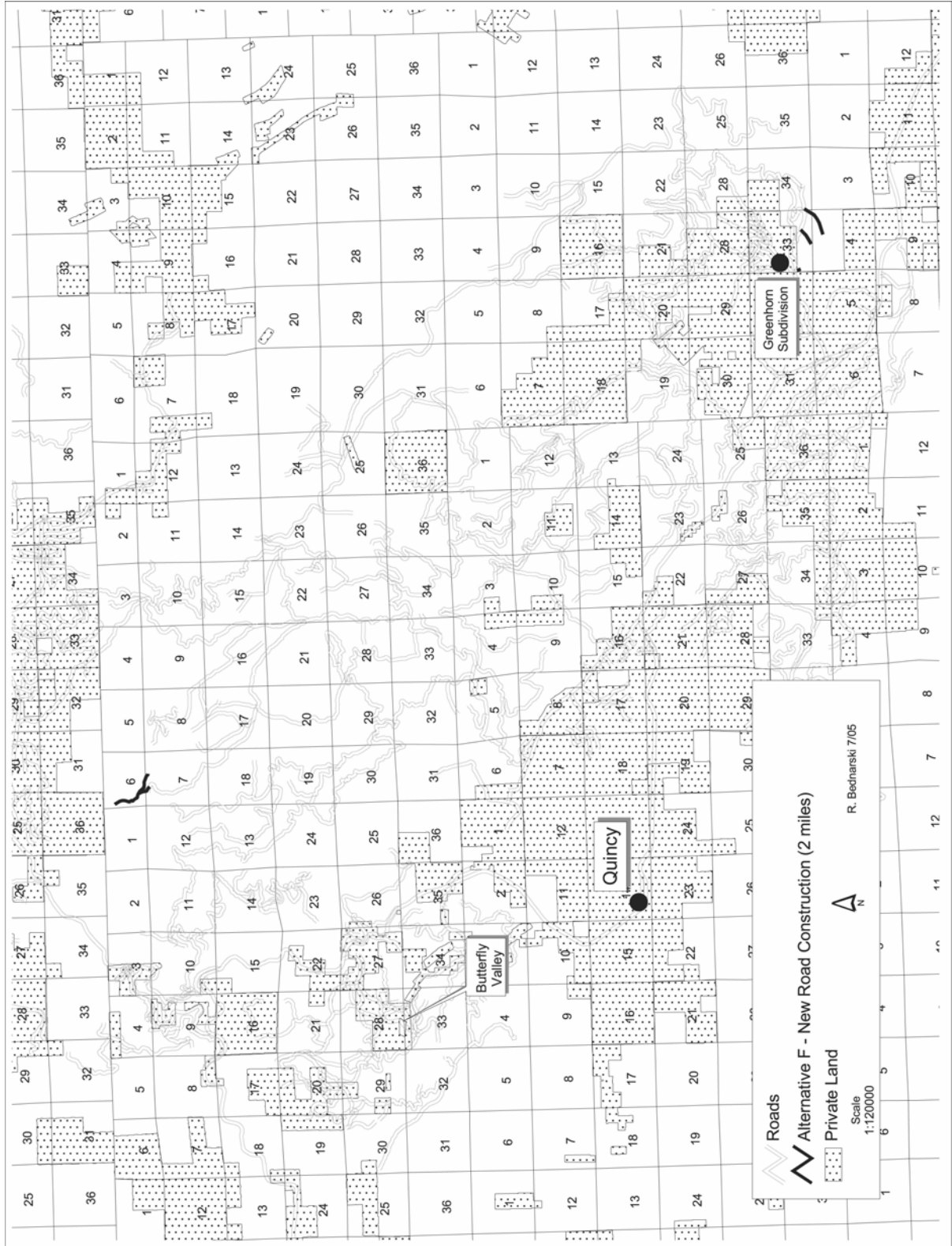


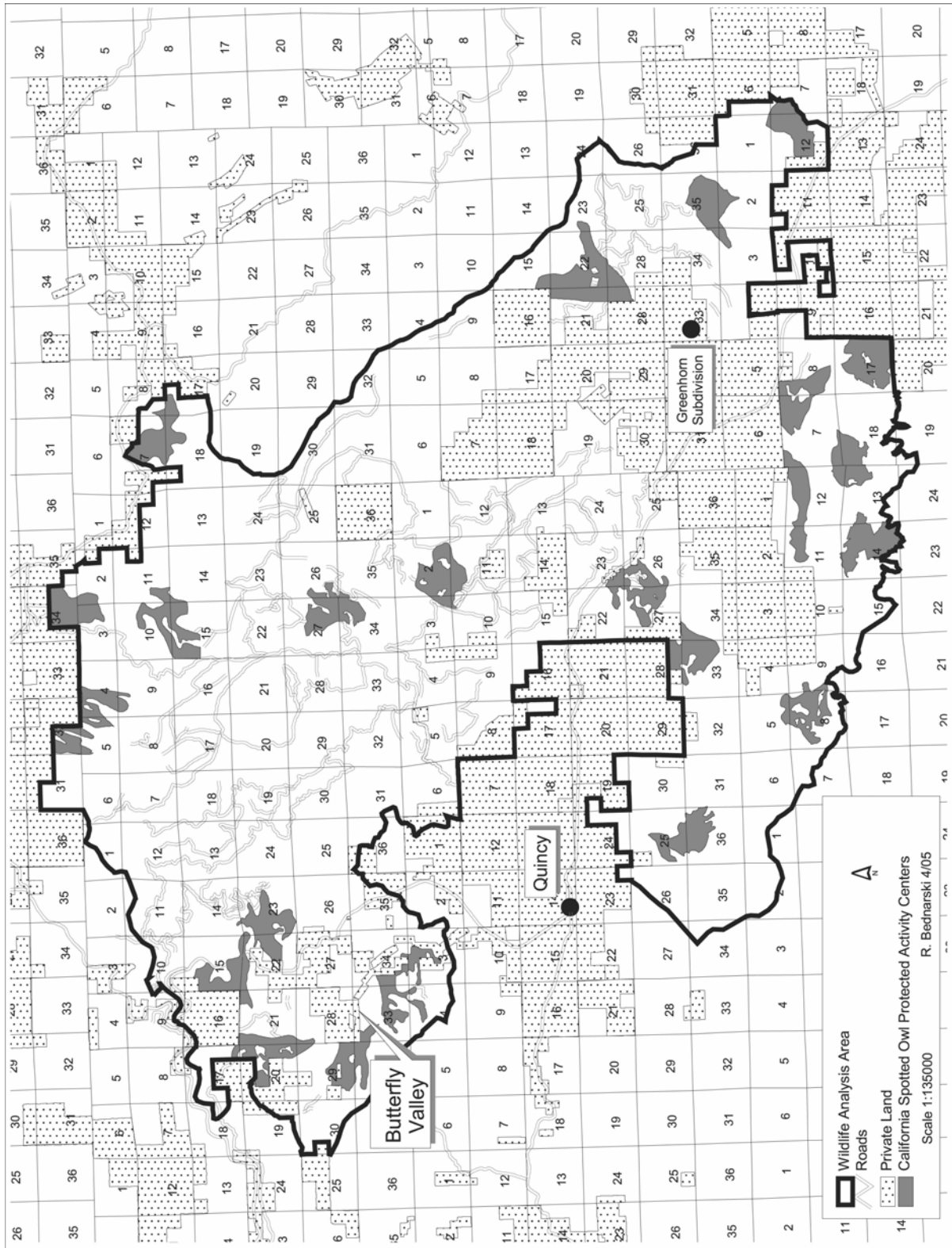


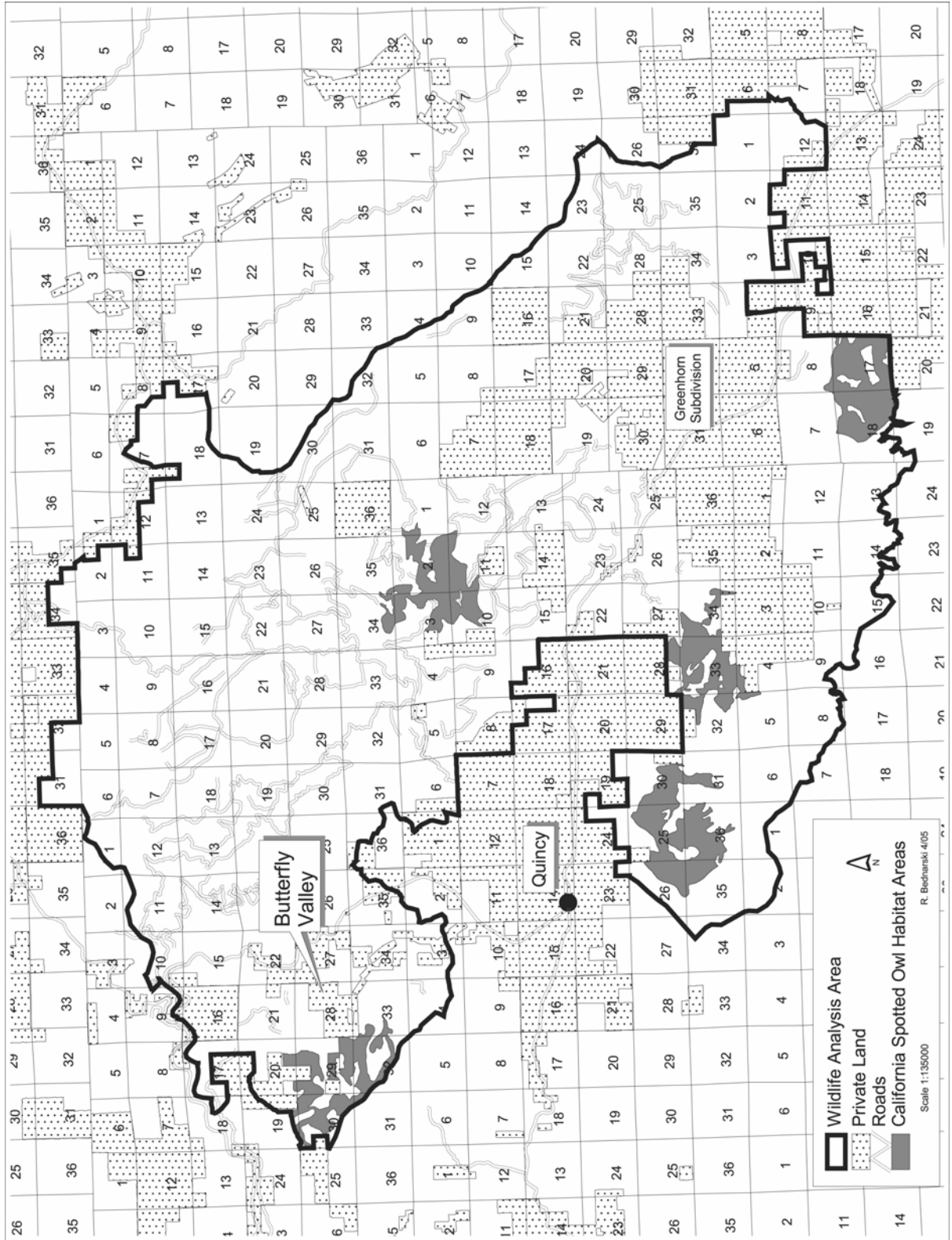


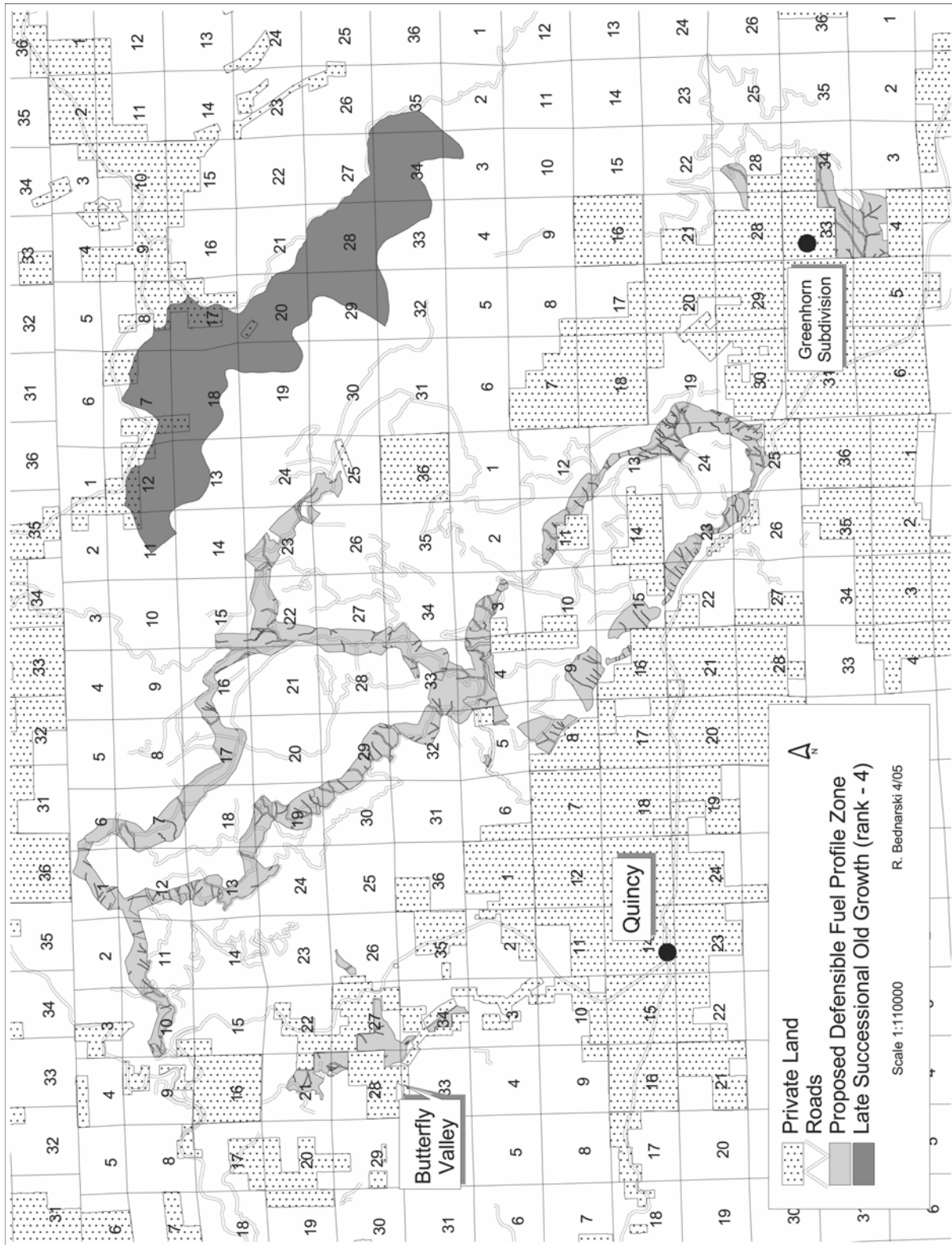


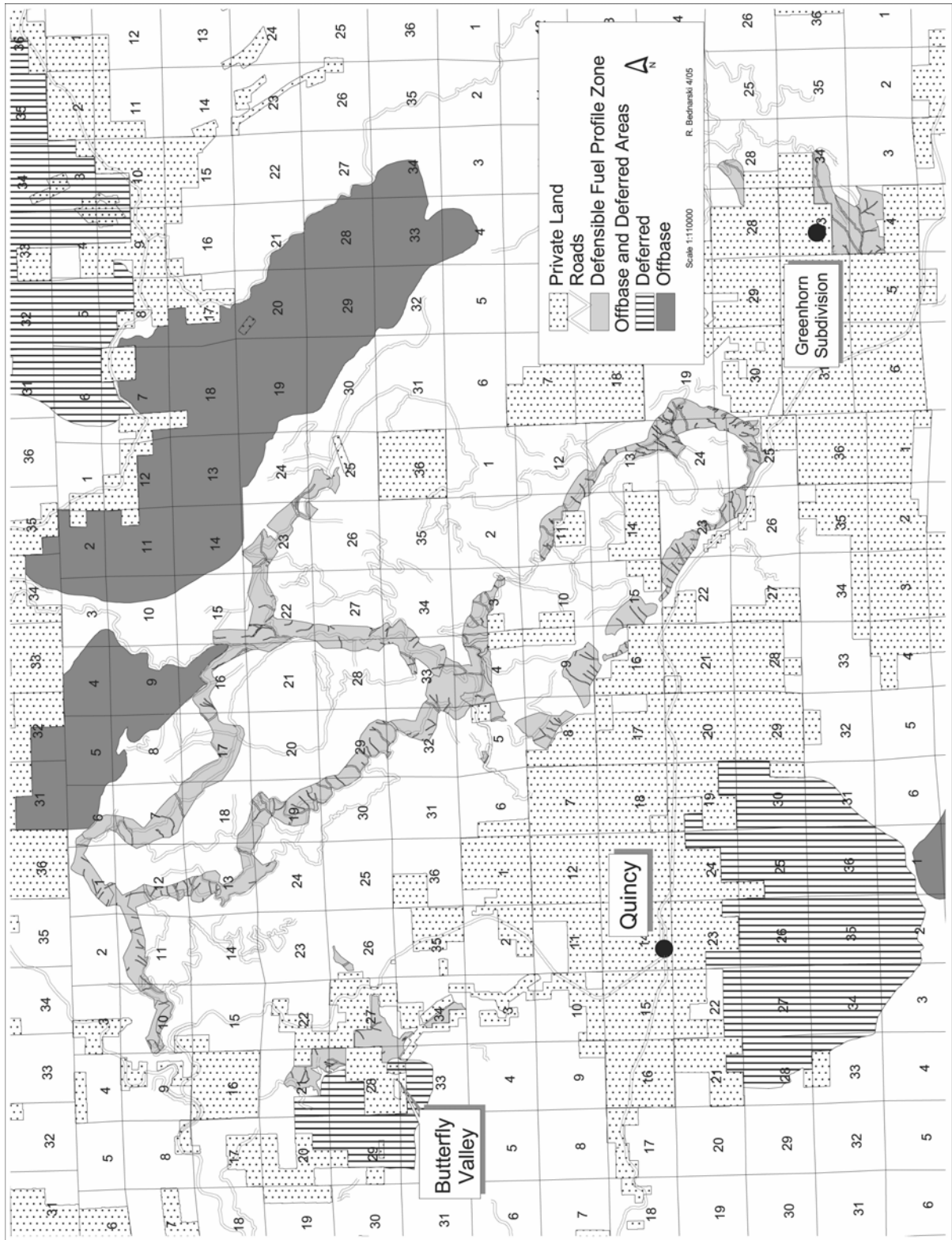












Appendix B

Fuel Reduction — Existing Condition and Proposed Treatment by Treatment Unit

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Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit.

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
1 / 315	Sockum and Big Blackhawk	Gravelly loam to clay loam soils Moderate erosion hazard Elev: 4,200–4,600 feet Slope: 0–35% Aspect: predominantly SW	111 ac. Model 5 51 ac. Model 9 153 ac. Model 10 162 ac. FCC1 153 ac. FCC2 and 3	187ac Sierran mixed conifer 68ac. montane hardwood 53ac ponderosa pine 7ac montane chaparral	Mechanical harvest 50% of unit by ground-based equipment; prescribed fire Brush mastication and prescribed fire on portions of remaining 50%	Northwest portion of unit burned in wildfire in 1970 Taylor Creek present Irrigation Ditch present 14 ac in 5M and 5D classes Western third of unit in WUI
2 / 746	Big Blackhawk and Sockum	Very gravelly silt loam to clay loam soils Moderate to high erosion hazard Elev: 4,200–5,200 feet Slope: 0–55% Aspect: predominantly SW	376 ac. Model 5 264 ac. Model 9 106 ac. Model 10 640 ac. FCC1 106 ac. FCC2 and 3	140 ac Sierran mixed conifer 98 ac ponderosa pine 488 ac montane hardwood 20 ac montane chaparral	Prescribed fire Brush mastication on portions	Portions of unit burned by wildfire in 1931, 1943, 1970, 1972, 1977
3 / 323	Sockum and Estray	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 4,400–5,300 feet Slope: 6–45% Aspect: predominantly SW	13 ac. Model 5 4 ac. Model 9 306 ac. Model 10 17 ac. FCC1 306 ac. FCC2 and 3	316 ac Sierran mixed conifer 6 ac ponderosa pine 1ac montane chaparral	Mechanical harvest with ground-based equipment; prescribed fire	Between Mt. Hough Rd and Squirrel Ck 14 ac in 5M and 5D classes
4 / 320	Sockum and Estray	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 3,900–4,800 feet Slope: 0–5% Aspect: S	15 ac. Model 5 305 ac. Model 10 15 ac. FCC1 305 ac. FCC2 and 3	309 ac Sierran mixed conifer 11 ac ponderosa pine	Mechanical harvest 50% of unit by ground-based equipment; prescribed fire. Hand thin, pile and burn portions of remaining 50%	North of Williams Loop Dissected with drainages, steep and narrow WUI

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
5 / 28	Sockum	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 3,900–4,200 feet Slope: 6–45% Aspect: predominantly S	6 ac. Model 5 22 ac. Model 10 6 ac. FCC1 22 ac. FCC2 and 3	23 ac Sierra mixed conifer 5 ac ponderosa pine	Prescribed fire	Small, steep, open unit, adjacent to RR tracks and Hwy 70; uphill from tracks WUI
6 / 77	Sockum	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 3,800–4,300 feet Slope: 6–45% Aspect: predominantly W	8 ac. Model 5 69 ac. Model 10 8 ac. FCC1 69 ac. FCC2 and 3	77 ac Sierran mixed conifer	Mechanical harvest less than 30% of unit Hand thin, pile and burn portions of remaining unit	Power line Limited mechanical ground Access on small ridgetops WUI
7 / 156	Sockum	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 3,800–4,000 feet Slope: 0–45% Aspect: predominantly SW	40 ac. Model 5 17 ac. Model 9 99 ac. Model 10 57 ac. FCC1 99 ac. FCC2 and 3	99 ac Sierran mixed conifer 36 ac ponderosa pine 17 ac montane hardwood 4 ac montane chaparral	Prescribed fire	Along RR tracks Steep, just east of Massack WUI
8 / 20	Sockum	Gravelly loam to clay loam soils Moderate erosion hazard Elev: 3,700–3,900 feet Slope: 6–25% Aspect: predominantly SW	12 ac. Model 5 6 ac. Model 9 2 ac. Model 10 18 ac. FCC1 2 ac. FCC2 and 3	2 ac Sierran mixed conifer 12 ac ponderosa pine 6 ac montane hardwood	Prescribed fire	Along Chandler Rd, above RR tracks WUI

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
9 / 182	Sockum	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 3,700–4,300 feet Slope: 6–35% Aspect: predominantly SW	96 ac. Model 5 12 ac. Model 9 74 ac. Model 10 108 ac. FCC1 74 ac. FCC2 and 3	74 ac Sierran mixed conifer 19 ac montane hardwood 89 ac montane chaparral	Prescribed fire	Along Chandler Rd Johnson Hill WUI Steep portions
10 / 147	Sockum	Gravelly loam to clay loam soil Moderate to high erosion hazard Elev: 3,600–4,300 feet Slope: 6–45% Aspect: predominantly SW	79 ac. Model 5 55 ac. Model 9 13 ac. Model 10 134 ac. FCC1 13 ac. FCC2 and 3	75 ac Sierran mixed conifer 11 ac ponderosa pine 55 ac montane hardwood 6 ac montane chaparral	Prescribed fire	Along Chandler Rd WUI Steep below road
11 / 76	Estray	Gravelly loam to clay loam soils High to very high erosion hazard Elev: 5,000–5,400 Slope: 6–35% Aspect: predominantly S	6 ac. Model 5 67 ac. Model 10 6 ac. FCC1 67 ac. FCC2 and 3	60 ac Sierran mixed conifer 13 ac white fir 4 ac rock	Mechanical harvest portions along ridgetop and bottom near road; prescribed fire. Hand thin, pile and burn portions of remaining unit	3 acres of unit is nonflammable fuels Rock outcrops Near Greenhorn Ranch development WUI
12 / 152	Big Blackhawk	Gravelly loam to clay loam soils Moderate erosion hazard Elev: 4,900–5,300 feet Slope: 0–35% Aspect: predominantly S	43 ac. Model 5 1 ac. Model 9 107 ac. Model 10 44 ac. FCC1 107 ac. FCC2 and 3	150 ac Sierran mixed conifer 1 ac montane hardwood 1 ac montane chaparral	Prescribed fire and mastication on 40% of area	Portions of unit burned by wildfire in 1931 and 1943 Mid-slope 3 ac in 5M and 5D classes

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
13 / 322	Big Blackhawk	Very gravelly silt loam to clay loam soils Moderate to high erosion hazard Elev: 4,600–5,500 feet Slope 0–45% Aspect: predominantly SW	9 ac. Model 5 3 ac. Model 9 310 ac. Model 10 12 ac. FCC1 310 ac. FCC2 and 3	317 ac Sierran mixed conifer 5 ac ponderosa pine	Mechanical harvest by ground-based equipment; prescribed fire Hand thin, pile and burn steep portions of unit	Mid-slope, some steep ground in middle of unit Tributaries to Cashman Ck 204 ac in 5M and 5D classes
14 / 98	Big Blackhawk	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 4,700–5,300 feet Slope: 16–45% Aspect: predominantly W	1 ac. Model 9 97 ac. Model 10 1 ac. FCC1 97 ac. FCC2 and 3	98 ac Sierran mixed conifer	Mechanical harvest all Ground-based yarding on 25%; Aerial yarding on portions of remaining to evaluate effectiveness of biomass removal on steep slopes Prescribed fire on portions	Steep Possible thin along w/GS and ITS 31 ac in 5M and 5D classes
15 / 585	Big Blackhawk and Indian Falls	Very gravelly silt loam to clay loam soils Low to high erosion hazard Elev: 3,500–6,500 feet Slope: 6–55% Aspect: predominantly SW	201 ac. Model 5 200 ac. Model 9 180 ac. Model 10 401 ac. FCC1 180 ac. FCC2 and 3	156 ac Sierran mixed conifer 60 ac ponderosa pine 65 ac white fir 218 ac montane hardwood 83 ac montane chaparral 3 ac rock	Prescribed fire Brush mastication on portions	Large portion of unit burned by wildfire in 1946. 4 ac of unit is nonflammable fuels Goat Hill 5 ac in 5M and 5D classes Western third in WUI
16 / 29	Big Blackhawk	Very cobbly loam to clay loam soils Moderate to high erosion hazard Elev; 5,600–6,100 feet Slope: 16–55% Aspect: predominantly West	1 ac. Model 5 28 ac. Model 10 1 ac. FCC1 28 ac. FCC2 and 3	28 ac white fir 1 ac montane chaparral	Aerial yarding system to evaluate effectiveness of biomass removal on steep slopes Prescribed fire on portions	Steep 16 ac in 5M and 5D classes Clear Creek

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
17 / 733	Big Blackhawk and Indian Falls	Very cobbly loam to clay loam soils Moderate to high erosion hazard Elev: 5,500–6,600 feet Slope: 0–55% Aspect: predominantly SW	9 ac. Model 5 703 ac. Model 10 19 ac. Model 12 9 ac. FCC1 722 ac. FCC2 and 3	156 ac Sierran mixed conifer 572 ac white fir 3 ac montane chaparral 2 ac rock	Mechanical harvest with ground-based equipment; prescribed fire	2 ac. of unit is nonflammable fuels SW of Mt. Hough LO Broken topography Tollgate Creek 382 ac in 5M and 5D classes
18 / 871	Sockum, Big Blackhawk, and Indian Falls	Very gravelly clay loam to clay loam soils Moderate to high erosion hazard Elev: 4,800–6,000 feet Slope: 0–35% Aspect: predominantly S	21 ac. Model 5 1 ac. Model 9 848 ac. Model 10 1 ac. Model 12 22 ac. FCC1 849 ac. FCC2 and 3	494 ac Sierran mixed conifer 39 ac ponderosa pine 338 ac white fir	Mechanical harvest with ground-based equipment; prescribed fire	Near Rhinehart Mdw. Steep near bottom of unit 311 ac in 5M and 5D classes
19 / 293	Sockum and Indian Falls	Very cobbly loam to very cobbly clay loam soils Low to moderate soil erosion hazard Elev: 5,800–7,000 feet Slope: 0–45% Aspect: predominantly W	23 ac. Model 5 265 ac. Model 10 5 ac. Model 12 23 ac. FCC1 270 ac. FCC2 and 3	95 ac Sierran mixed conifer 198 ac white fir	Mechanical harvest with ground-based equipment; prescribed fire	N of Soloman Saddle Includes large plantations 37 ac in 5M and 5D classes
20 / 137	Sockum	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 3,800–4,500 feet Slope: 0–55% Aspect: predominantly SW	107 ac. Model 5 27 ac. Model 9 3 ac. Model 10 134 ac. FCC1 3 ac. FCC2 and 3	3 ac Sierran mixed conifer 28 ac montane hardwood 106 ac montane chaparral	Prescribed fire	Unit burned by wildfire in past, not in last 35 years Behind Chandler Rd Steep brushfield S. of Johnson Hill WUI

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
21 / 198	Big Blackhawk	Very gravelly silt loam to clay loam soils Moderate soil erosion hazard Elev: 3,400–3,900 feet Slope: 0–45% Aspect: predominantly N	1 ac. Model 5 9 ac. Model 9 188 ac. Model 10 10 ac. FCC1 188 ac. FCC2 and 3	189 ac Sierran mixed conifer 9 ac ponderosa pine	Mechanical harvest 50% of unit by ground-based equipment; prescribed fire Aerial yarding systems on remaining portions of unit Right-of-way needed	8 ac in 5M and 5D classes WUI
22 / 7	Big Blackhawk	Very gravelly silt loam to clay loam soils Moderate to high soil erosion hazard Elev: 4,100–4,300 feet Slope: 0–35% Aspect: predominantly W	5 ac. Model 5 2 ac. Model 10 5 ac. FCC1 2 ac. FCC2 and 3	3 ac Sierran mixed conifer 4 ac montane chaparral	Prescribed fire	Unit burned by wildfire in 1970 WUI
23 / 434	Estray	Very gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 4,400–4,900 feet Slope: 0–25% Aspect: predominantly W	434 ac. Model 10 0 ac. FCC1 434 ac. FCC2 and 3	399 ac Sierran mixed conifer 35 ac white fir	Mechanical harvest with ground-based equipment; prescribed fire Temporary road construction; decommissioned after use	Near Greenhorn Ranch development WUI
24 / 24	Big Blackhawk	Very gravelly silt loam to sandy loam soils Moderate to high erosion hazard Elev: 3,200–3,500 feet Slope: 6–45% Aspect: predominantly NW	1 ac. Model 5 23 ac. Model 10 1 ac. FCC1 23 ac. FCC2 and 3	24 ac Sierran mixed conifer	hand thin, pile, and burn	Cascades Trailhead Near Keddie, adjacent to development on PVT 5 ac in 5M and 5D classes WUI

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

Unit / Acres	Watershed	Physical Characteristics	Existing Condition		Treatment, Logging System, and Access Needs ^c	Remarks ^d
			Fuels ^a	CWHR Vegetation Type ^b		
25 / 181	Big Blackhawk	Very gravelly silt loam to loam soils Moderate to high erosion hazard Elev: 3,400–4,100 feet Slope: 0–45% Aspect: predominantly S	57 ac. Model 5 124 ac. Model 10 57 ac. FCC1 124 ac. FCC2 and 3	181 ac Sierran mixed conifer	Mechanical harvest with ground-based equipment; prescribed fire Temporary road construction; decommissioned after use	N of Butterfly Valley 6 ac in 5M and 5D classes WUI
26 / 87	Sockum	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 4,500–4,800 feet Slope: 0–35% Aspect: predominantly SW	40 ac. Model 5 47 ac. Model 10 40 ac. FCC1 47 ac. FCC2 and 3	87 ac Sierran mixed conifer	Prescribed fire	Above Empire Ravine, east of Massack. WUI
27 / 67	Estray	Gravelly loam to loam soils Moderate to high erosion hazard Elev: 4,400–4,800 feet Slope: 0–45% Aspect: predominantly N	67 ac. Model 10 0 ac. FCC1 67 ac. FCC2 and 3	67 ac Sierran mixed conifer	Prescribed fire	Steep WUI
28 / 41	Big Blackhawk	Gravelly loam to loam soils Moderate to high erosion hazard Elev: 3,500–3,800 feet Slope: 10–40% Aspect: predominantly SW	25 ac. Model 9 16 ac. Model 10 41 ac. FCC2 and 3	15 ac. Sierran mixed conifer 26 ac. ponderosa pine	Hand thin, pile and burn portions of remaining unit	Within the WUI

a. Fire behavior fuel models from Anderson 1982:

- Fuel Model 5 – low, green shrubs with light surface litter, includes short montane chaparral
- Fuel Model 9 – long-needle pine and oak hardwood stands with light surface litter
- Fuel Model – Sierran mixed conifer with understory, moderate to heavy down and dead surface fuels
- Fuel Model – moderate slash with heavy surface fuels in the in the 0–3 inch diameter size class

Table B.1. Fuel reduction — existing condition and proposed treatment by treatment unit (continued).

FCC1 =	Fire Condition Class 1. Fire regimes are within historical range. Risk of losing key ecosystem components to wildfire is low. Species composition and structure are functioning within historical range. Potential wildfire intensities and severity are low to moderate. Desired condition.
FCC2 =	Fire Condition Class 2. Fire regimes are slightly altered from historical range. Risk of losing key ecosystem components to wildfire is moderate. This results in moderate changes in one or more of the following: fire size, fire intensity, and fire severity. In forestland, there is moderate encroachment of shade tolerant tree species. Potential wildfire intensities and severity are moderate to high. Not desired condition.
FCC3 =	Fire Condition Class 3. Fire regimes are significantly altered from historical range. Risk of losing key ecosystem components to wildfire is high. This results in dramatic changes to one or more of the following: fire size, fire intensity, and fire severity. In forestland, there is high encroachment and establishment of shade tolerant tree species. Potential wildfire intensities and severity are moderate to extreme. Not desired condition.

b. These large treatment units include several tree size and density classes of each CWHR type listed. This additional detail is not shown to keep the table from being too large, but the information is available at the Mt. Hough Ranger District office.

c. RHCAs are found throughout the fuel treatment units - refer to “Action 1 – Fuel Treatments” for design elements pertaining to treatments in RHCAs. For each unit, the desired post-treatment conditions are:

Surface fuels less than 3 inches in diameter would be less than or equal to 5 tons per acre.

Healthy and vigorous stands would not have interlocking tree crowns for the next ten years.

Conifers with suppressed and intermediate crown classes containing ladder fuels would be absent.

Live crown base height would be 15 to 25 feet.

Surface fuels would include 10 to 15 tons per acre of the largest down logs.

Snag levels would be as follows: 2 of the largest snags per acre in DFPZ units in WUIs, 4 of the largest snags per acre in mixed conifer stands, and 6 of the largest snags per acre in red fir stands.

d. 5M and 5D and 6 are CWHR classifications. These classes are subject to specific canopy-cover retention guidelines – refer to “Action 1 – Fuel Treatments.”

Appendix C
Group Selection and
Individual Tree Selection by Planning Area

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Table C.1. Group selection and individual tree selection by planning area.

Plan Area / Plan Area Acres	Group selection Acres ^a	ITS Acres ^b	Water-shed	Physical Characteristics	Existing Condition ^c	Logging System and Access Needs ^d	Remarks
1G / 545	26	80	Estray	Very gravelly sandy loam soils Moderate to high erosion hazard Elev: 5,400–7,000 feet Slope: 6–55% Aspect: predominantly W	144 ac Sierra mixed conifer 324 ac white fir 63 ac montane chaparral 3 ac montane riparian 11 ac rock	65% ground-based equipment 35% aerial yarding	Rock outcrops
2G / 1,010	36	55	Estray	Very cobbly loam to gravelly sandy loam soils Moderate to high erosion hazard Elev: 5,700–7,300 feet Slope: 0–55% Aspect: predominantly SW	168 ac Sierra mixed conifer 775 ac white fir 6 ac red fir 33 ac montane chaparral 28 ac rock	15% ground-based equipment 85% aerial yarding	Rock outcrops; carnivore network
3G / 314	16	90	Estray	Very cobbly loam to very gravelly loam soils Low to moderate erosion hazard Elev: 5,200–6,600 feet Slope: 6–55% Aspect: predominantly SW	179 ac Sierra mixed conifer 135 ac white fir	85% ground-based equipment 15% aerial yarding	Rock outcrops
4G / 562	51	20	Estray	Very cobbly loam to gravelly loam soils Moderate to high erosion hazard Elev: 5,300–7,100 feet Slope: 16–55% Aspect: predominantly SW	126 ac Sierra mixed conifer 433 ac white fir 3 ac rock	10% ground-based equipment 90% aerial yarding	Rock outcrops
5G / 881	50	240	Estray	Very cobbly loam to clay loam soils Low to high erosion hazard Elev: 4,800–6,400 feet Slope: 0–55% Aspect: predominantly S	664 ac Sierra mixed conifer 3 ac ponderosa pine 11 ac lodgepole pine 203 ac white fir	95% ground-based equipment 5% aerial yarding New system road construction Temporary road construction, decommissioned after use	Carnivore network

Table C.1. Group selection and individual tree selection by planning area (continued).

Plan Area / Plan Area Acres	Group selection Acres ^a	ITS Acres ^b	Water-shed	Physical Characteristics	Existing Condition ^c	Logging System and Access Needs ^d	Remarks
6G / 1,626	85	300	Estray	Very cobbly loam to very gravelly loam soils Low to very high erosion hazard Elev: 6,200–7,600 feet Slope: 0–65% Aspect: predominantly SW	55 ac Sierra mixed conifer 1293 ac white fir 253 ac red fir 23 ac montane chaparral 2 ac rock	100% ground-based equipment	Some rock outcrops and erosive peridotite soils
7G / 99	12	54	Estray	Gravelly loam to gravelly sandy loam soils Moderate to high erosion hazard Elev: 4,400–4,600 feet Slope: 0–25% Aspect: predominantly N	99 ac Sierra mixed conifer	100% ground-based equipment	
8G / 502	26	0	Estray	Very gravelly sand loam to clay loam soils Moderate to high erosion hazard Elev: 4,400–4,900 feet Slope: 0–45% Aspect: predominantly W	467 ac Sierra mixed conifer 35 ac white fir	100% ground-based equipment Temporary road construction; decommissioned after use	Rock outcrops
9G / 135	8	32	Estray	Gravelly loam to clay loam soils Moderate to high erosion hazard Elev: 4,300–5,000 feet Slope: 6–55% Aspect: predominantly E	134 ac Sierra mixed conifer 1 ac ponderosa pine	50% ground-based equipment 50% aerial yarding Temporary road construction; decommissioned after use	
10G / 561	43	100	Sockum	Very gravelly sand loam to sandy loam soils Moderate to high erosion hazard Elev: 4,600–6,400 feet Slope: 0–45% Aspect: predominantly NE	99 ac Sierra mixed conifer 5 ac ponderosa pine 651 ac white fir 2 ac montane hardwood 4 ac montane chaparral	100% ground-based equipment	

Table C.1. Group selection and individual tree selection by planning area (continued).

Plan Area / Plan Area Acres	Group selection Acres ^a	ITS Acres ^b	Water-shed	Physical Characteristics	Existing Condition ^c	Logging System and Access Needs ^d	Remarks
11G / 391	22	100	Sockum	Gravelly loam to clay loam soils Moderate to high soil erosion hazard Elev: 4,000–6,400 feet Slope: 0–35% Aspect: predominantly W	377 ac Sierra mixed conifer 10 ac ponderosa pine 4 ac montane chaparral	100% ground-based equipment	
12G / 1,178	42	348	Sockum	Very cobbly loam to clay loam soils Low to high erosion hazard Elev: 4,600–6,100 feet Slope: 0–45% Aspect: predominantly SW	1133 ac Sierra mixed conifer 6 ac ponderosa pine 29 ac white fir 10 ac montane chaparral	100% ground-based equipment New system road construction Temporary road construction; decommissioned after use	
13G / 509	40	140	Sockum	Gravelly loam to clay loam soils Moderate to high soil erosion hazard Elev: 3,900–4,700 feet Slope: 0–55% Aspect: predominantly W	699 ac Sierra mixed conifer 4 ac montane hardwood 3 ac montane chaparral 3 ac rock	100% ground-based equipment	
14G / 3,277	254	873 and 100ac bio-mass	Sockum	Very cobbly loam to clay soils Low to very high erosion hazard Elev: 4,400–7,200 feet Slope: 0–65% Aspect: predominantly W	1306 ac Sierra mixed conifer 29 ac ponderosa pine 1867 ac white fir 13 ac montane hardwood 35 ac montane chaparral 13 ac montane riparian 14 ac rock	75% ground-based equipment 25% aerial yarding New system road construction Temporary road construction, decommissioned after use	Rock outcrops and erosive peridotite soils
15G / 309	22	80	Sockum	Very cobbly loam to very gravelly loam soils Low to moderate erosion hazard Elev: 6,600–7,600 feet Slope: 0–55% Aspect: predominantly SW	11 ac Sierra mixed conifer 261 ac white fir 37 ac red fir	100% ground-based equipment	Carnivore network

Table C.1. Group selection and individual tree selection by planning area (continued).

Plan Area / Plan Area Acres	Group selection Acres ^a	ITS Acres ^b	Water-shed	Physical Characteristics	Existing Condition ^c	Logging System and Access Needs ^d	Remarks
16G / 503	30	159	Sockum	Gravelly loam to clay loam soils Moderate to high soil erosion hazard Elev: 3,500–4,500 feet Slope: 0–45% Aspect: predominantly E	495 ac Sierra mixed conifer 1 ac ponderosa pine 7 ac montane chaparral	100% ground-based equipment	
17G / 659	27	23	Big Black-hawk	Very gravelly silt loam to clay loam soils Moderate to high erosion hazard Elev: 3,500–5,100 feet Slope: 0–55% Aspect: predominantly W	538 ac Sierra mixed conifer 53 ac ponderosa pine 58 ac montane hardwood 10 ac montane chaparral	40% ground-based equipment 60% aerial yarding New system road construction	
18G / 1,246	94	308 and 100ac biomass	Big Black-hawk	Very cobbly loam to clay loam soils Moderate erosion hazard Elev: 4,800–6,300 feet Slope: 0–55% Aspect: predominantly S	968 ac Sierra mixed conifer 15 ac ponderosa pine 342 ac white fir 3 ac montane hardwood 17 ac montane chaparral 1 ac montane riparian	75% ground-based equipment 25% aerial yarding New system road construction	
19G / 5,162	324	801 and 100ac biomass	Big Black-hawk	Very cobbly loam to clay loam soils Moderate to high erosion hazard Elev: 3,700–7,200 feet Slope: 0–65% Aspect: predominantly SW	2852 ac Sierra mixed conifer 71 ac ponderosa pine 2316 ac white fir 71 ac red fir 56 ac montane hardwood 75 ac montane chaparral 19 ac montane riparian 2 ac rock	95% ground-based equipment 5% aerial yarding	Some rock outcrop and rubble lands
20G / 92	10	0	Big Black-hawk	Gravelly loam to loam soils Moderate to high erosion hazard Elev: 3,300–4,100 feet Slope: 16–45% Aspect: predominantly SE	92 ac Sierra mixed conifer	100% aerial yarding	

Table C.1. Group selection and individual tree selection by planning area (continued).

Plan Area / Plan Area Acres	Group selection Acres ^a	ITS Acres ^b	Water-shed	Physical Characteristics	Existing Condition ^c	Logging System and Access Needs ^d	Remarks
21G / 193	10	0	Big Black-hawk	Gravelly loam to loam soils Moderate to high erosion hazard Elev: 3,400–4,100 feet Slope: 0–45% Aspect: predominantly SE	193 ac Sierra mixed conifer	100% ground-based equipment Temporary road construction, decommissioned after use	
22G / 198	14	0	Big Black-hawk	Gravelly loam to loam soils Moderate to high erosion hazard Elev: 3,400–3,900 feet Slope: 0–45% Aspect: predominantly N	189 ac Sierra mixed conifer 9 ac ponderosa pine	100% ground-based equipment Right-of-way needed	
23G / 302	15	77	Big Black-hawk	Gravelly loam to loam soils Moderate to high erosion hazard Elev: 3,200–4,100 feet Slope: 6–65% Aspect: predominantly NE	276 ac Sierra mixed conifer 2 ac ponderosa pine 14 ac montane hardwood 10 ac montane chaparral	100% ground-based equipment	Some areas of riverwash
24G / 823	90	120 and 50ac biomass	Indian Falls	Very cobbly loam to sandy loam soils Low to high erosion hazard Elev: 4,900–7,200 feet Slope: 0–55% Aspect: predominantly W	576 ac Sierra mixed conifer 242 ac white fir 5 ac red fir	45% ground-based equipment 55% aerial yarding New system road construction Temporary road construction, decommissioned after use	Some rock outcrop and rubble lands

a. The group selection harvest would be distributed across all 24 planning areas. An estimate of the acres of groups in each planning area is given. The actual acres of groups would depend upon feasibility determined during project layout.

b. ITS – Individual tree selection acres. Biomass would be harvested from four planning areas, as shown.

c. These large treatment units include several tree size and density classes of each CWHR type listed. This additional detail is not shown to keep the table from being too large, but the information is available at the Mt. Hough Ranger District office.

d. Logging system needs are based on the group selection harvest.

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Appendix D
Proposed Actions
for Each Road in Each Watershed

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Appendix D

Proposed Actions for Each Road in Each Watershed

Table D.1. Proposed actions for each road in each watershed.

Treatment	Road Number	Length (miles)
Alternative A — Big Blackhawk Creek Watershed		
System Road Construction	24N14Z	0.6
Temporary Road Construction	Non system	4.0
Closure	25N12YA	0.4
Closure	25N12YB	0.7
Closure	25N12YE	0.8
Closure	25N14F1	0.1
Closure	25N58	3.6
Decommission	24N86	0.4
Decommission	25N12C	0.2
Decommission	25N12C1	0.4
Decommission	25N12YC	0.4
Decommission	25N12YD	0.6
Decommission	Non system	2.6
Reconstruction (heavy)	25N73B	1.2
Reconstruction (moderate)	25N19	5.4
Reconstruction (moderate)	25N73	7.2
Reconstruction (light)	25N12Y	5.4
Reconstruction (light)	25N53	1.4
Reconstruction (light)	25N73A	0.5
Reconstruction (moderate)	Non system	7.0
Reconstruction (moderate/heavy)	25N14	13.3
Alternative A — Estray Creek Watershed		
System Road Construction	24N16Z	0.6
Temporary Road Construction	Non system	1.3
Closure	24N19A	0.9
Decommission	23N61	0.7
Decommission	25N41C	0.5
Decommission	Non system	0.6
Reconstruction (heavy)	25N18A	0.7
Reconstruction (moderate)	24N51B	0.4
Reconstruction (moderate)	Plumas County 508	1.4
Reconstruction (light)	24N02X	8.3
Reconstruction (light)	24N31Y	1.4
Reconstruction (light)	24N66	2.2
Reconstruction (light)	24N67	2.0
Reconstruction (light)	25N18	3.6
Reconstruction (light)	25N29	6.6
Reconstruction (light)	25N42	0.2

Table D.1. Proposed actions for each road in each watershed (continued).

Treatment	Road Number	Length (miles)
Alternative A — Estray Creek Watershed (continued)		
Reconstruction (light/moderate)	24N35Y	0.5
Reconstruction (moderate)	Non system	0.7
Indian Falls Watershed		
Temporary Road Construction	Non system	1.6
Closure	25N14F	0.7
Closure	25N14F1	0.1
Decommission	26N19Y	0.8
Reconstruction (light)	25N10Y	0.5
Reconstruction (light)	25N29	0.3
Reconstruction (moderate)	Non system	0.1
Reconstruction (moderate/heavy)	25N14	0.8
Alternative A — Sockum Creek Watershed		
System Road Construction	25N10YB	0.1
Temporary Road Construction	Non system	0.6
Closure	24N16X	1.6
Closure	24N51A	1.4
Closure	24N52Y	0.7
Closure	25N10YB	0.5
Closure	25N41B	0.2
Closure	25N41G	0.3
Decommission	24N15X	0.3
Decommission	24N17XA	0.3
Decommission	24N33Y	0.8
Decommission	24N51D	0.3
Decommission	24N77	1.1
Decommission	24N85	1.2
Decommission	25N10YB	0.4
Decommission	25N14	0.4
Decommission	25N41D	0.3
Decommission	Non system	3.2
Reconstruction (heavy)	25N10YA1	0.8
Reconstruction (heavy)	25N18A	1.9
Reconstruction (heavy) & Closure	25N07B	1.8
Reconstruction (heavy) & Closure	25N07C	0.7
Reconstruction (moderate)	24N20Y	0.8
Reconstruction (moderate)	24N33Y	1.1
Reconstruction (moderate)	24N51B	1.3
Reconstruction (moderate)	24N80	2.2
Reconstruction (moderate)	25N18D	0.4
Reconstruction (moderate)	25N73	0.0
Reconstruction (moderate) & Closure	25N14B	1.5
Reconstruction (moderate) & Closure	25N18E	1.0
Reconstruction (light)	24N16	3.0
Reconstruction (light)	24N51	2.6

Table D.1. Proposed actions for each road in each watershed (continued).

Treatment	Road Number	Length (miles)
Reconstruction (light)	25N07	1.0
Reconstruction (light)	25N10Y	2.4
Reconstruction (light)	25N18	0.7
Reconstruction (light)	25N29	1.9
Reconstruction (light)	25N41A	1.0
Reconstruction (light/heavy)	25N10YA	1.4
Reconstruction (light/moderate)	24N35Y	0.9
Reconstruction (moderate)	Non system	4.0
Reconstruction (moderate/heavy)	25N14	6.3
Reconstruction (moderate/heavy)	25N14	5.8

Treatment	Road Number	Length (miles)
Alternative C — Big Blackhawk Creek Watershed		
System Road Construction	24N14Z	0.6
Temporary Road Construction	Non system	4.0
Closure	25N12YA	0.4
Closure	25N14F1	0.1
Closure	25N58	3.6
Decommission	24N86	0.4
Decommission	25N12C	0.2
Decommission	25N12C1	0.4
Decommission	25N12YC	0.4
Decommission	25N12YD	0.6
Decommission	Non system	2.6
Reconstruction (heavy)	25N73B	1.2
Reconstruction (moderate)	25N19	5.4
Reconstruction (moderate)	25N73	7.2
Reconstruction (light)	25N12Y	5.4
Reconstruction (light)	25N53	1.4
Reconstruction (light)	25N73A	0.5
Reconstruction (moderate)	Non system	7.0
Reconstruction (moderate/heavy)	25N14	13.3
Alternative C — Estray Creek Watershed		
System Road Construction	24N16Z	0.6
Temporary Road Construction	Non system	1.3
Closure	24N19A	0.9
Decommission	23N61	0.7
Decommission	25N41C	0.5
Decommission	Non system	0.6
Reconstruction (heavy)	25N18A	0.7
Reconstruction (moderate)	24N51B	0.4
Reconstruction (moderate)	508	1.4

Table D.1. Proposed actions for each road in each watershed (continued).

Treatment	Road Number	Length (miles)
Reconstruction (light)	24N02X	2.4
Reconstruction (light)	24N31Y	1.4
Reconstruction (light)	24N66	2.2
Reconstruction (light)	24N67	2.0
Reconstruction (light)	25N18	3.6
Reconstruction (light)	25N29	6.6
Reconstruction (light)	25N42	0.2
Reconstruction (light/moderate)	24N35Y	0.5
Reconstruction (moderate)	Non system	0.7
Alternative C — Indian Falls Watershed		
Temporary Road Construction	Non system	1.6
Closure	25N14F	0.7
Closure	25N14F1	0.1
Decommission	26N19Y	0.8
Reconstruction (light)	25N10Y	0.5
Reconstruction (light)	25N29	0.3
Reconstruction (moderate)	Non system	0.1
Reconstruction (moderate/heavy)	25N14	0.8
Alternative C — Sockum Creek Watershed		
System Road Construction	25N10YB	0.1
Temporary Road Construction	Non system	0.6
Closure	25N41G	0.3
Decommission	24N15X	0.3
Decommission	24N17XA	0.3
Decommission	24N33Y	0.8
Decommission	24N51D	0.3
Decommission	24N85	1.2
Decommission	25N41D	0.3
Decommission	Non system	1.4
Reconstruction (heavy)	25N10YA1	0.8
Reconstruction (heavy)	25N18A	1.9
Reconstruction (heavy) & Closure	25N07B	1.8
Reconstruction (heavy) & Closure	25N07C	0.7
Reconstruction (moderate)	24N20Y	0.8
Reconstruction (moderate)	24N33Y	1.1
Reconstruction (moderate)	24N51B	1.3
Reconstruction (moderate)	24N80	2.2
Reconstruction (moderate)	25N18D	0.4
Reconstruction (moderate)	25N73	0.0
Reconstruction (moderate) & Closure	25N14B	1.5
Reconstruction (moderate) & Closure	25N18E	1.0
Reconstruction (light)	24N16	3.0
Reconstruction (light)	24N51	2.6
Reconstruction (light)	25N07	1.0

Table D.1. Proposed actions for each road in each watershed (continued).

Treatment	Road Number	Length (miles)
Reconstruction (light)	25N10Y	2.4
Reconstruction (light)	25N18	0.7
Reconstruction (light)	25N29	1.9
Reconstruction (light)	25N41A	1.0
Reconstruction (light/heavy)	25N10YA	1.4
Reconstruction (light/moderate)	24N35Y	0.9
Alternative C — Sockum Creek Watershed (continued)		
Reconstruction (moderate)	Non system	4.0
Reconstruction (moderate/heavy)	25N14	6.3

Alternatives D and E — Big Blackhawk Creek Watershed		
Treatment	Road Number	Length (miles)
System Road Construction	24N14Z	0.6
System Road Construction	25N73B	0.2
Temporary Road Construction	Non system	4.0
Closure	25N12YA	0.4
Closure	25N14F1	0.1
Closure	25N58	3.6
Decommission	24N86	0.4
Decommission	25N12C	0.2
Decommission	25N12C1	0.4
Decommission	25N12YC	0.4
Decommission	25N12YD	0.6
Decommission	Non system	2.6
Decommission	25N73B	0.2
Reconstruction (heavy)	25N73B	1.0
Reconstruction (moderate)	25N19	5.4
Reconstruction (moderate)	25N73	7.2
Reconstruction (light)	25N12Y	5.4
Reconstruction (light)	25N53	1.4
Reconstruction (light)	25N73A	0.5
Reconstruction (moderate)	Non system	7.0
Reconstruction (moderate/heavy)	25N14	13.3
Alternatives D and E — Estray Creek Watershed		
System Road Construction	24N16Z	0.6
Temporary Road Construction	Non system	1.3
Closure	24N19A	0.9
Decommission	23N61	0.7
Decommission	25N41C	0.5
Decommission	Non system	0.6

Table D.1. Proposed actions for each road in each watershed (continued).

Reconstruction (heavy)	25N18A	0.7
Reconstruction (moderate)	24N51B	0.4
Reconstruction (moderate)	508	1.4
Reconstruction (light)	24N02X	2.4
Reconstruction (light)	24N31Y	0.7
Reconstruction (light)	25N18	3.6
Reconstruction (light)	25N29	6.6
Reconstruction (light/moderate)	24N35Y	0.5
Reconstruction (moderate)	Non system	0.7
Alternatives D and E — Indian Falls Watershed		
Temporary Road Construction	Non system	1.6
Closure	25N14F	0.7
Closure	25N14F1	0.1
Decommission	26N19Y	0.8
Alternatives D and E — Indian Falls Watershed (continued)		
Reconstruction (light)	25N10Y	0.5
Reconstruction (light)	25N29	0.3
Reconstruction (moderate)	Non system	0.1
Reconstruction (moderate/heavy)	25N14	0.8
Alternatives D and E — Sockum Creek Watershed		
System Road Construction	25N10YB	0.1
Temporary Road Construction	Non system	0.6
Closure	25N41G	0.3
Decommission	24N15X	0.3
Decommission	24N17XA	0.3
Decommission	24N33Y	0.8
Decommission	24N51D	0.3
Decommission	24N85	1.2
Decommission	25N41D	0.3
Decommission	Non system	1.4
Reconstruction (heavy)	25N10YA1	0.8
Reconstruction (heavy)	25N18A	1.9
Reconstruction (heavy) & Closure	25N07B	1.8
Reconstruction (heavy) & Closure	25N07C	0.7
Reconstruction (moderate)	24N20Y	0.8
Reconstruction (moderate)	24N33Y	1.1
Reconstruction (moderate)	24N51B	1.3
Reconstruction (moderate)	24N80	2.2
Reconstruction (moderate)	25N18D	0.4
Reconstruction (moderate)	25N73	0.0
Reconstruction (moderate) & Closure	25N14B	1.5

Table D.1. Proposed actions for each road in each watershed (continued).

Reconstruction (moderate) & Closure	25N18E	1.0
Reconstruction (light)	24N16	3.0
Reconstruction (light)	24N51	2.6
Reconstruction (light)	25N07	1.0
Reconstruction (light)	25N10Y	2.4
Reconstruction (light)	25N18	0.7
Reconstruction (light)	25N29	1.9
Reconstruction (light)	25N41A	1.0
Reconstruction (light/heavy)	25N10YA	1.4
Reconstruction (light/moderate)	24N35Y	0.9
Reconstruction (moderate)	Non system	4.0
Reconstruction (moderate/heavy)	25N14	6.3

Treatment	Road Number	Length (miles)
Alternative F — Big Blackhawk Creek Watershed		
Closure	25N12YA	0.4
Closure	25N14F1	0.1
Closure	25N58	3.6
Decommission	24N86	0.4
Alternative F — Big Blackhawk Creek Watershed (continued)		
Decommission	25N12C	0.2
Decommission	25N12C1	0.4
Decommission	25N12YC	0.4
Decommission	25N12YD	0.6
Decommission	Non system	2.6
Reconstruction	25N19A	0.4
Reconstruction	25N46	0.5
Reconstruction (heavy)	25N73B	0.9
Reconstruction (light)	25N53	1.4
Reconstruction (light)	25N73A	0.4
Reconstruction (moderate)	25N19	8.1
Reconstruction (moderate)	25N73	7.2
Reconstruction (moderate)	Non system	0.9
Reconstruction (moderate/heavy)	25N14	6.1
Temporary Road Construction	Non system	1.1
Alternative F — Estray Creek Watershed		
Closure	24N19A	0.9
Decommission	23N61	0.7
Decommission	25N41C	0.5
Decommission	Non system	0.6
Reconstruction (light)	24N02X	0.0
Reconstruction (light)	24N31Y	3.1

Table D.1. Proposed actions for each road in each watershed (continued).

Treatment	Road Number	Length (miles)
Reconstruction (light/moderate)	24N35Y	0.5
Reconstruction (moderate)	24N51B	0.0
Reconstruction (moderate)	508	1.5
Temporary Road Construction	Non system	0.9
Alternative F — Indian Falls Watershed		
Closure	25N14F	0.7
Closure	25N14F1	0.1
Decommission	26N19Y	0.8
Reconstruction (light)	25N10Y	0.8
Reconstruction (moderate)	Non system	0.1
Reconstruction (moderate/heavy)	25N14	0.8
Alternative F — Sockum Creek Watershed		
Closure	25N07B	1.8
Closure	25N07C	0.7
Closure	25N14B	1.5
Closure	25N18E	1.0
Closure	25N41G	0.3
Decommission	24N15X	0.3
Decommission	24N17XA	0.3
Decommission	24N33Y	0.8
Decommission	24N51D	0.3
Alternative F — Sockum Creek Watershed (continued)		
Decommission	24N85	1.2
Decommission	25N41D	0.3
Decommission	Non system	1.4
Reconstruction (light)	25N07	1.0
Reconstruction (light)	25N10Y	2.4
Reconstruction (light)	25N29	1.8
Reconstruction (light/moderate)	24N35Y	0.9
Reconstruction (moderate)	24N20Y	2.6
Reconstruction (moderate)	25N73	0.0
Reconstruction (moderate)	Non system	1.1
Reconstruction (moderate/heavy)	25N14	5.8

Notes:

- a. Heavy reconstruction may include road relocation as well as light and heavy treatments.
- b. Moderate reconstruction may include light treatment as well as construction of drainage structures, which would require use of heavy equipment such as bulldozers and back hoes.
- c. Light reconstruction involves clearing the brush along the roadside and grading the road surface.

Appendix E

**Site-Specific Details on Proposed
Group Selection, Individual Tree Selection,
and Biomass Harvest Acres
by Planning Area by Alternative**

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Table E.1. Harvest acres proposed by alternative by planning area.

Plan Area Code	Plan Area Acres	Plan Area Available Acres	Alternative A			Alternative C			Alternative D			Alternative E			Alt F Acres of Groups, ITS Biomass
			GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
1G	545	305	26	80	0	0	0	0	0	0	0	0	0	0	0
2G	1,010	912	36	55	0	0	0	0	0	0	0	0	0	0	0
3G	314	253	16	90	0	23	55	0	0	0	0	0	0	0	0
4G	562	366	51	20	0	84	0	0	42	20	0	42	20	0	0
5G	881	652	50	240	0	98	250	0	70	100	0	70	100	0	0
6G	1,626	1,203	85	300	0	85	700	0	85	300	0	85	300	0	0
7G	99	77	12	54	0	15	62	0	0	0	0	0	0	0	0
8G	502	439	26	0	0	30	0	0	0	0	0	0	0	0	0
9G	135	83	8	32	0	0	0	0	0	0	0	0	0	0	0
10G*	561	368	43	100	0	43	190	0	42	100	0	42	100	0	0
11G	391	261	22	100	0	30	50	0	30	50	0	30	50	0	0
12G	1,178	677	42	348	0	61	180	0	77	217	0	77	217	0	0
13G*	509	355	40	140	0	60	140	0	40	140	0	40	140	0	0
14G	3,277	2,048	234	873	100	261	873	100	233	600	100	233	600	100	0
14G DFPZ Unit No. 18	0	200	20	0	0	20	0	0	20	0	0	20	0	0	0
15G	309	177	20	80	0	20	50	0	20	60	0	20	60	0	0
16G	503	303	30	159	0	20	80	0	25	80	0	25	80	0	0
17G	659	281	27	23	0	25	23	0	24	23	0	24	23	0	0
18G*	1,246	517	54	308	100	84	308	100	55	100	100	55	100	100	0
18 G DFPZ Unit No. 18	0	300	30	0	0	30	0	0	30	0	0	30	0	0	0
19G*	5,162	2,060	234	801	100	384	919	100	234	500	100	234	500	100	0
19G DFPZ Unit No. 13, 14, 16, 17	0	1,052	97	0	0	97	0	0	105	0	0	105	0	0	0
20G	92	65	10	0	0	0	0	0	0	0	0	0	0	0	0
21G	193	153	10	0	0	15	0	0	15	0	0	15	0	0	0

Table E.1. Harvest acres proposed by alternative by planning area (continued).

Plan Area Code	Plan Area Acres	Plan Area Available Acres	Alternative A			Alternative C			Alternative D			Alternative E			Alt F Acres of Groups, ITS Biomass
			GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
22G	198	181	14	0	0	18	0		18	0	0	18	0	0	0
23G	302	234	20	77	0	0	0		0	0	0	0	0		0
24G	823	532	90	120	50	97	120	50	61	80	50	61	80	50	0
Total	21,077	14,054	1,347	4,000	350	1,600	4,000	350	1,226	2,370	350	1,226	2,370	350	0

Notes:

The planning area available acres are the total acres of CWHR class 4M, 4D, 5M, and 5D within the planning areas but outside the protected activity centers and riparian habitat conservation areas.

Alternatives D, E, and F are at or below 11.4% density for group selection acres.

Table E.2. Proposed group selection harvest system by planning area by alternative.

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
1g	1	0	113	0		9	50	0	0	0	0	0	0	0	0
	2	0	0	70		6	0	0	0	0	0	0	0	0	0
	3	0	89	0		8	30	0	0	0	0	0	0	0	0
	4	33	0	0		3	0	0	0	0	0	0	0	0	0
1G TOTAL		33	202	70	305	26	80	0	0	0	0	0	0	0	0
2g	1	0	0	370		10	0	0	0	0	0	0	0	0	0
	2	372	0	0		16	0	0	0	0	0	0	0	0	0
	3	0	35	0		2	25	0	0	0	0	0	0	0	0
	4	0	47	0		3	30	0	0	0	0	0	0	0	0
	5	0	0	88		5	0	0	0	0	0	0	0	0	0
2G TOTAL		372	82	458	912	36	55	0	0	0	0	0	0	0	0
3g	1	0	223	0		14	90	0	23	55	0	0	0	0	0
	2	0	0	30		2	0	0	0	0	0	0	0	0	0
3G TOTAL		0	223	30	253	16	90	0	23	55	0	0	0	0	0
4g	1	300	0	0		45	0	0	74	0	0	36	0	0	0
	2	0	66	0		6	20	0	10	0	0	6	20	0	0
4G TOTAL		300	66	0	366	51	20	0	84	0	0	42	20	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continued).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
5g	1	0	160	0		12	120	0	32	120	0	20	30	0	0
	2	0	142	0		11	45	0	28	50	0	15	40	0	0
	3	0	201	0		15	45	0	28	50	0	20	10	0	0
	4	0	113	0		10	30	0	10	30	0	15	20	0	0
	5	0	0	36		2	0	0	0	0	0	0	0	0	0
5G TOTAL		0	616	36	652	50	240	0	98	250	0	70	100	0	0
6g	1	0	486	0		30	100	0	36	250	0	30	100	0	0
	2	0	355	0		30	100	0	33	225	0	30	100	0	0
	3	0	362	0		25	100	0	34	225	0	25	100	0	0
6G TOTAL		0	1203	0	1203	85	300	0	85	700	0	85	300	0	0
7g	1	0	77	0		12	54	0	15	62	0	0	0	0	0
7G TOTAL		0	77	0	77	12	54	0	15	62	0	0	0	0	0
8g	1	0	439	0		26	0	0	30	0	0	0	0	0	0
8G TOTAL		0	439	0	439	26	0	0	30	0	0	0	0	0	0
9g	1	0	70	0		4	32	0	0	0	0	0	0	0	0
	2	0	0	9		2	0	0	0	0	0	0	0	0	0
	3	0	0	5		2	0	0	0	0	0	0	0	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continue).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
9G TOTAL		0	70	14	84	8	32	0	0	0	0	0	0	0	0
10g	1	0	368	0		43	100	0	43	190	0	42	100	0	0
10G TOTAL		0	368	0	368	43	100	0	43	190	0	42	100	0	0
11g	1	0	261	0		22	100	0	30	50	0	30	50	0	0
11G TOTAL		0	261	0	261	22	100	0	30	50	0	30	50	0	0
12g	1	0	277	0		16	138	0	19	100	0	32	100	0	0
	2	0	215	0		16	140	0	20	40	0	24	50	0	0
	3	0	149	0		6	70	0	11	40	0	17	50	0	0
	4	0	36	0		4	0	0	0	0	0	4	7	0	0
12G TOTAL		0	677	0	677	42	348	0	61	180	0	77	217	0	0
13g	1	0	33	0		6	20	0	6	20	0	3	20	0	0
	2	0	123	0		14	40	0	24	40	0	14	40	0	0
	3	0	199	0		20	80	0	30	80	0	23	80	0	0
13G TOTAL		0	355	0	355	40	140	0	60	140	0	40	140	0	0
14g	1	0	521	0		35	300	50	50	300	50	59	200	50	0
	2	0	0	37		6	8	0	7	8	0	4	8	0	0
	3	0	45	0		8	8	0	9	8	0	5	8	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continued).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
	4	0	182	0		25	40	0	20	40	0	21	40	0	0
	5	0	798	0		86	400	50	100	400	50	90	269	50	0
	6	234	0	0		30	0	0	47	0	0	27	0	0	0
	7	0	0	31		6	25	0	6	25	0	4	25	0	0
	8	0	0	86		16	0	0	0	0	0	10	0	0	0
	9	0	114	0		22	92	0	22	92	0	13	50	0	0
	DFPZ Unit 18	0	200	0		20	0	0	20		0	20		0	0
14G TOTAL		234	1860	154	2247	254	873	100	281	873	100	253	600	100	0
15g	1	0	177	0		20	80	0	18	50	0	20	60	0	0
15G TOTAL		0	177	0	177	20	80	0	20	50	0	20	60	0	0
16g	1	0	130	0		14	66	0	10	40	0	12	40	0	0
	2	0	173	0		16	93	0	10	40	0	13	40	0	0
16G TOTAL		0	303	0	303	30	159	0	20	80	0	25	80	0	0
17g	1	0	0	154		10	0	0	10	0	0	10	0	0	0
	2	0	0	61		6	0	0	10	0	0	6	0	0	0
	3	0	29	0		4	23	0	5	23	0	4	23	0	0
	4	0	14	0		3	0	0	0	0	0	2	0	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continue).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
	5	0	23	0		4	0	0	0	0	0	2	0	0	0
17G TOTAL		0	66	215	280	27	23	0	25	23	0	24	23	0	0
18g	1	0	264	0		27	160	50	50	160	50	27	40	50	0
	2	0	0	110		12	40	0	0	40	0	0	0	0	0
	3	0	23	0		4	19	0	4	19	0	4	19	0	0
	4	0	0	23		4	10	0	4	10	0	4	0	0	0
	5	0	97	0		7	79	50	26	79	50	20	41	50	0
	DFPZ Unit 18	0	300	0		30	0	0	30	0	0	30	0	0	0
18G TOTAL		0	684	133	817	84	308	100	114	308	100	85	100	100	0
19g	1	90	90	0		15	58	0	36	144	0	21	50	0	0
	3	0	12	0		2	10	0	2	10	0	1	5	0	0
	4	0	169	0		14	80	0	30	80	0	19	40	0	0
	5	0	114	0		7	20	0	20	20	0	13	20	0	0
	6	0	33	0		4	27	0	6	27	0	4	10	0	0
	7	0	19	0		2	0	0	2	0	0	2	0	0	0
	8	0	52	0		7	30	0	10	30	0	6	20	0	0
	9	0	59	0		7	49	0	10	49	0	7	20	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continued).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
	10	0	29	0		6	23	0	6	23	0	3	12	0	0
	11	0	57	0		8	30	0	11	30	0	7	20	0	0
	12	0	86	0		10	30	0	16	30	0	10	20	0	0
	13	0	33	0		5	10	0	6	10	0	4	10	0	0
	14	0	41	0		5	10	0	8	10	0	5	10	0	0
	15	0	65	0		5	10	0	12	10	0	7	10	0	0
	16	0	0	54		5	0	0	10	0	0	6	0	0	0
	17	0	13	0		2	11	0	2	11	0	1	5	0	0
	18	0	60	0		10	25	0	12	25	0	7	25	0	0
	19	0	46	0		10	20	0	9	20	0	5	20	0	0
	20	0	248	0		30	120	100	50	153	100	35	75	100	0
	21	0	158	0		25	50	0	30	50	0	18	30	0	0
	22	0	76	0		10	30	0	14	40	0	9	20	0	0
	23	0	0	24		5	0	0	5	0	0	3	0	0	0
	24	0	16	0		3	0	0	3	0	0	2	0	0	0
	25	0	47	0		3	10	0	9	10	0	5	10	0	0
	26	0	80	0		4	33	0	12	33	0	9	20	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continue).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
	27	0	13	0		3	11	0	2	11	0	1	2	0	0
	29	0	124	0		6	81	0	20	70	0	14	30	0	0
	30	0	41	0		3	10	0	8	10	0	5	10	0	0
	31	73	0	0		10	0	0	15	0	0	8	0	0	0
	32	0	16	0		3	13	0	3	13	0	2	6	0	0
	33	0	0	24		5	0	0	5	0	0	3	0	0	0
	DFPZ Unit 13	0	28	0		28	0	0	28	0	0	28	0	0	0
	DFPZ Unit 14	0	0	0		0	0	0	0	0	0	0	0	0	0
	DFPZ Unit 16	0	2	0		2	0	0	2	0	0	2	0	0	0
	DFPZ Unit 17	0	67	0		67	0	0	67	0	0	67	0	0	0
19G TOTAL		163	2847	101	3111	331	801	100	481	919	100	339	500	100	0
20g	1	0	0	65		10	0	0	0	0	0	0	0	0	0
20G TOTAL		0	0	65	65	10	0	0	0	0	0	0	0	0	0
21g	DFPZ Unit 25	0	153	0		10	0	0	15	0	0	15	0	0	0
21G TOTAL		0	153	0	153	10	0	0	15	0	0	15	0	0	0
22g	DFPZ Unit 21	0	181	0		14	0	0	18	0	0	18	0	0	0

Table E.2. Proposed group selection harvest system by planning area by alternative (continued).

Planning Area Number	Unit Number	Logging System			Total Net Acres	Alternative A			Alternative C			Alternative D & E			Alternative F GS, ITS and Biomass Acres
		Helicopter	Tractor	Yarding		GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	GS Acres	ITS Acres	Biomass Acres	
22G TOTAL		0	181	0	181	14	0	0	18	0	0	18	0	0	0
23g	2	0	22	0		4	10	0	0	0	0	0	0	0	0
	3	0	0	41		4	0	0	0	0	0	0	0	0	0
	4	0	113	0		8	50	0	0	0	0	0	0	0	0
	5	0	58	0		4	17	0	0	0	0	0	0	0	0
23G TOTAL		0	193	41	235	20	77	0	0	0	0	0	0	0	0
24g	1	0	0	250		50	0	0	39	0	0	28	0	0	0
	2	0	92	0		15	50	0	18	50	0	10	30	0	0
	3	0	190	0		25	70	50	38	70	50	22	50	50	0
24G TOTAL		0	282	250	532	90	120	50	97	120	50	61	80	50	0
					14,055	1,347	4,000	350	1,600	4,000	350	1,226	2,370	350	0

Table E.3. Acres of proposed group selection harvest and subsequent percent intensity or distribution by alternative.

Plan Area Code	Plan Area Acres	Plan Area Available Acres	Alternative A		Alternative C		Alternative D		Alternative E		Alternative F
			Acres of Groups	Percent GS Intensity	Acres of Groups	Percent GS Intensity	Acres of Groups	Percent GS Intensity	Acres of Groups	Percent Gs Intensity	Acres of Groups
1G	545	305	26	9	0	0	0	0	0	0	0
2G	1,010	912	36	4	0	0	0	0	0	0	0
3G	314	253	16	6	23	9	0	0	0	0	0
4G	562	366	51	14	84	23	42	11	42	11	0
5G	881	652	50	8	98	15	70	11	70	11	0
6G	1,626	1,203	85	7	85	7	85	7	85	7	0
7G	99	77	12	16	15	19	0	0	0	0	0
8G	502	439	26	6	30	7	0	0	0	0	0
9G	135	83	8	10	0	0	0	0	0	0	0
10G	561	368	43	12	43	12	42	11	42	11	0
11G	391	261	22	8	30	11	30	11	30	11	0
12G	1,178	677	42	6	61	9	77	11	77	11	0
13G	509	355	40	11	60	17	40	11	40	11	0
14G	3,277	2,048	234	11	261	13	233	11	233	11	0
14G DFPZ Unit No. 18	0	200	20	10	20	10	20	10	20	10	0
15G	309	177	20	11	20	11	20	11	20	11	0
16G	503	303	30	10	20	7	25	8	25	8	0
17G	659	281	27	10	25	9	24	9	24	9	0
18G*	1,246	517	54	10	84	16	55	11	55	11	0
18 G DFPZ Unit No. 18	0	300	30	10	30	10	30	10	30	10	0
19G*	5,162	2,060	234	11	384	19	234	11	234	11	0
19G DFPZ Unit No. 13, 14, 16, 17	0	1,052	97	9	97	9	105	10	105	10	
20G	92	65	10	15	0	0	0	0	0	0	0
21G	193	153	10	7	15	10	15	10	15	10	0

Table E.3. Acres of proposed group selection harvest and subsequent percent intensity or distribution by alternative (continued).

Plan Area Code	Plan Area Acres	Plan Area Available Acres	Alternative A		Alternative C		Alternative D		Alternative E		Alternative F
			Acres of Groups	Percent GS Intensity	Acres of Groups	Percent GS Intensity	Acres of Groups	Percent GS Intensity	Acres of Groups	Percent Gs Intensity	Acres of Groups
22G	198	181	14	8	18	10	18	10	18	10	0
23G	302	234	20	9	0	0	0	0	0	0	0
24G	823	532	90	17	97	18	61	11	61	11	0
Total	21,077	14,054	1,347		1,600		1,226		1,226		0

Appendix F
Standard Management Requirements
and Monitoring Plan

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Appendix F Standard Management Requirements and Monitoring Plan

Wildlife and Fisheries

The Standard Management Requirements (SMRs) are displayed in the *Biological Assessment / Biological Evaluation for the Empire Vegetation Management Project*. This report is part of the Empire Project Record on file at the Mount Hough Ranger District; a copy is available upon request.

California Spotted Owl: Implementation of the action alternatives during the nesting season around known spotted owl nest sites may cause disturbance that could disrupt nesting behaviors and potentially lead to nest failure. To prevent disturbance to nest sites, the following planning areas / roads should not have any land disturbance activities occurring between March 1 and August 15 due to location of known nest site in relation to a proposed harvest unit: planning areas 3G and 14G (Units 2 and 4), planning area 24G (Unit 1), and FS 25N10YA.

Northern Goshawk: Implementation of the action alternatives during the nesting season around known nest sites could may disturbance that could disrupt nesting behaviors and potentially lead to nest failure. To prevent disturbance to nest sites, the following planning areas, Defensible Fuel Profile Zones (DFPZ), and roads should not have any land disturbing activities occurring between March 1 and September 15 due to location of known nest site in relation to a proposed harvest unit: planning area 10G (eastern portion); planning area 13 (Unit 1); planning area 21G; DFPZ Unit 3; FS 24N33Y; and DFPZ unit 13 and the groups within unit 13; and DFPZ unit 14 and the groups within unit 14.

Hydrology and Soils

These SMRs are displayed in the “Cumulative Watershed Effects and Soils Assessment for the Empire Vegetation Management Project.” This report is part of the Empire Project Record on file at the Mount Hough Ranger District; a copy is available upon request.

The following items describe standard management requirements that were incorporated into the design of Alternatives A, C, D, E, and F:

1. Water quality would be protected through the use of Best Management Practices (BMPs) (USDA Forest Service, 2000). BMPs are the primary method employed by the Forest Service and the State of California to prevent water quality degradation and to meet State Water Quality objectives relating to non-point sources of pollution. BMPs were incorporated in the design of the action alternatives, and are listed in this appendix.

2. Site-specific measures that relate directly to these BMPs would be utilized on this project to minimize erosion and resultant sedimentation. Measures would also be employed to minimize negative changes in other water quality parameters such as dissolved oxygen, water temperature, and turbidity. These mitigation measures follow the Scientific Analysis Team (SAT) Guidelines for areas adjacent to stream courses, lakes and wetland areas and streamside guidelines presented in the Plumas Land Management Plan. Protection and improvement measures would include minimizing disturbance of riparian zones, retention of snags for wildlife, stream shading, recruitment of large organic debris in stream channels, maintenance of side slope and stream channel stability, and prevention of an over-accumulation of activity-generated organic debris in stream channels. These measures, which were incorporated in the design of the action alternatives, will reduce the risk of cumulative and local impacts to water quality and channel stability.
3. Apply the Scientific Analysis Team (SAT) Guidelines, as set forth in the HFQLG EIS and ROD.
4. Incorporate the soil standards from the PNF Forest Plan (pages 4-43 to 4-45), as amended by the 2004 Sierra Nevada Forest Plan Amendment ROD (page 69, Table 2), and incorporate design elements to maintain soil compaction at or below the compaction threshold.
5. Soil and water quality protection measures are described below:
 - a. Restrict all ground-based operations to less than 35 percent slopes outside of riparian habitat conservation areas (RHCAs), and less than 30 percent slopes within designated treatment areas of RHCAs. RHCAs with sensitive areas (e.g., springs, bogs, highly erodible or unstable soils, etc.) will not be entered with ground-based equipment.
 - b. Within RHCAs, bare ground resulting from operations should be mulched. If slash or wood chips are not available, certified weed free straw or rice straw will be used. Consult with the district soil scientist and botanist prior to mulching.
 - c. Within RHCAs, utilize wider skid trail spacing and implement mechanical operations in a manner that will reduce ground disturbance. Consult with the district soil scientist during unit layout, contract administration, and project implementation to minimize ground disturbance and erosion risk from mechanical operations.
 - d. Unless otherwise agreed to by the physical scientist and sale administrator, landings and skid trail approaches to landings (to a distance of 200 feet) would be subsoiled through the full depth of compaction to restore soil porosity. New temporary roads would be decommissioned, which may include subsoiling of the road bed. To achieve the best results and prevent additional soil damage, a winged subsoiler should be used. A drawing with design specifications is included below. The subsoiler would be lifted where substantial root and bole damage to larger trees would occur from subsoiling. Skids with slopes greater than 25 percent would not be subsoiled. Subsoiling would not occur on shallow soils where the displacement of rocks disrupts soil horizons or where there are concerns about the spread of root disease, or damage to tree boles. Install water-bars prior to subsoiling operations.
 - e. Implement the following winter or unseasonably wet weather standards in all units:

Operations may occur when soil is dry, based on the field method: reach down and collect a small quantity of soil and try to mold it into a ball. If a ball is formed that holds together under repeated tosses, the soil is too wet for equipment operation.

Winter operations may occur only when the ground is frozen to a depth of 5 inches or over 8 inches of packed snow

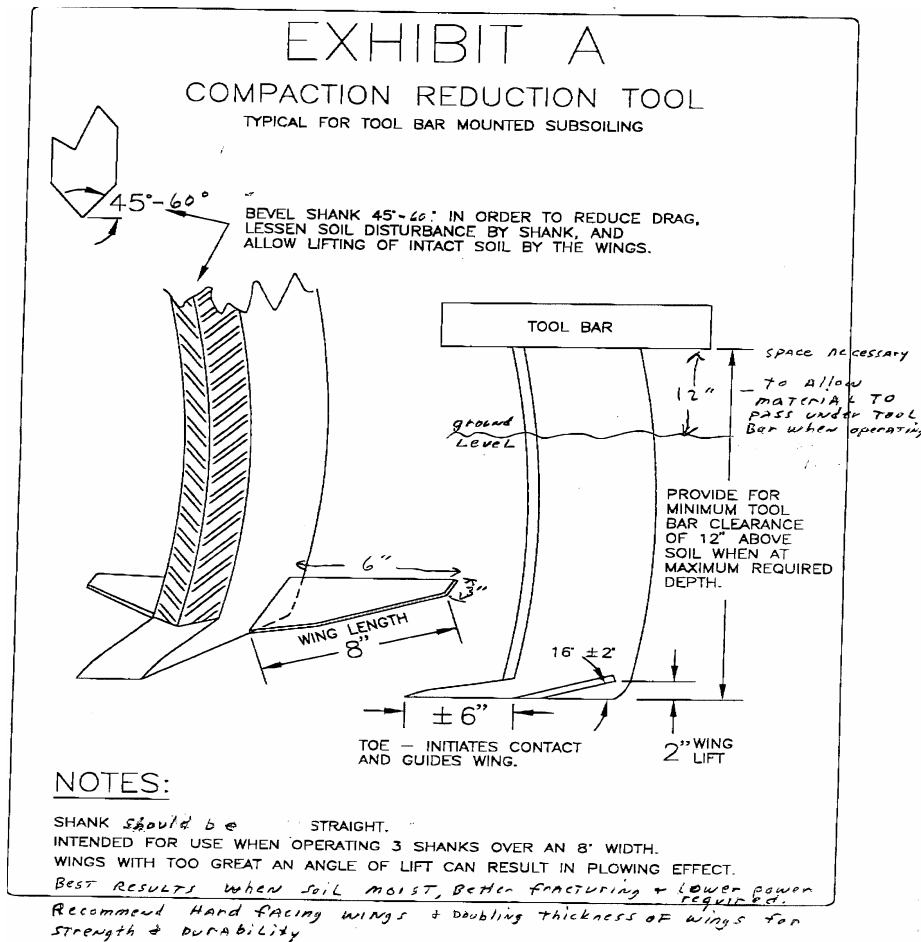
- f. In their existing condition, three planning areas (units 6G, 7G, and 9G) exceed the compaction threshold for skid trails and landings, and three more (3G, 5G, 11G) are predicted to exceed

this compaction threshold. If these units are treated, they would be reevaluated and additional subsoiling would occur in skid trails, landings, and/or group selection areas to reduce the extent of skid trails and landings. Planning areas 3G, 7G and 9G would not be treated in alternatives D, E, or F. These additional subsoiling practices would leave these planning areas in an improved state that is at or below the compaction threshold.

6. All standard timber sale contract provisions will be included in timber sales. A number of these provisions are designed to protect water quality, control and limit erosion and sedimentation to watercourses. These provisions include, but are not limited to, the following:

- a. B5.0 Transportation facilities
 - B5.12 Use of roads by purchaser
 - B5.2 Specified roads
 - B5.21 Engineering
 - B5.211 Contract plans
 - B5.212 Construction staking
 - B5.23 Use of partially constructed roads
 - B5.3 Road maintenance
- b. B6.0 Operations
 - B6.312 Plan of operations for road construction
 - B6.34 Sanitation and servicing
 - B6.341 Prevention of oil spills
 - B6.342 Hazardous substances
- c. B6.4 Conduct of logging
 - B6.42 Skidding and yarding
 - B6.422 Landings and skid trails
- d. B6.5 Streamcourse protection
- e. B6.6 Erosion prevention and control
 - B6.61 Meadow protection
 - B6.62 Wetlands protection
 - B6.63 Temporary roads
 - B6.64 Landings
 - B6.6.65 Skid trails and firelines
 - B6.66 Current operating areas
 - B6.67 Erosion control and structure maintenance
- f. C provisions as applicable

Winged subsoiler Shank Design For The Ripper Tool Bar



Best Management Practices. Water quality would be protected through the use of Best Management Practices (BMPs) (USDA Forest Service 2000). BMPs are the primary method employed by the Forest Service and the State of California to prevent water quality degradation and to meet California State Water Quality objectives relating to nonpoint sources of pollution. BMPs were incorporated in the design of the action alternatives and are listed under the regulatory framework. The following BMPs are applied when applicable:

Standard Management Requirement (BMP)	Responsible person(s)	Timeframe
Timber management practices		
1.1 Timber Sale Planning Process	IDT, watershed specialist, prep officer, TSA	Project planning
1.2 Timber Harvest Unit Design	IDT watershed specialist	Project planning, implementation
1.3 Surface Erosion Hazard Determination for Timber Harvest Unit Design	Watershed specialist	Project planning, implementation
1.4 Use of Sale Area Maps For Designating Water Quality Protection Needs	Watershed specialist, prep officer, TSA	Project planning, implementation
1.5 Limiting Operating Period of Timber Sale Activities	IDT, watershed specialist, TSA	Project planning, implementation
1.6 Protection of Unstable Lands	IDT, watershed specialist	Project planning, implementation
1.8 Streamside Management Zone Designation	IDT, Watershed specialist, prep officer, TSA	Project planning,

Standard Management Requirement (BMP)		Responsible person(s)	Timeframe
1.9	Determining tractor loggable ground	IDT, Watershed specialist	implementation
1.10	Tractor Skidding Design	Watershed specialist, prep officer, TSA	Project planning, implementation
1.11	Suspended log yarding in timber harvesting	IDT, Watershed specialist	Project planning, implementation
1.12	Log Landing Location	Watershed specialist, prep officer, TSA	Project planning, implementation
1.13	Erosion Prevention And Control Measures During Timber Sale Operations	TSA, watershed specialist	Project implementation
1.14	Special Erosion Prevention Measures On disturbed Land	Watershed specialist, prep officer, TSA	Project planning, implementation
1.15	Re-vegetation of Areas Disturbed By Harvest	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
1.16	Log Landing Erosion Control	Prep officer, TSA	Project planning, implementation
1.17	Erosion Control On Skid Trails	Watershed specialist, prep officer, TSA	Project planning, implementation
1.18	Meadow Protection During Timber Harvesting	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
1.19	Streamcourse and aquatic Protection	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
1.20	Erosion Control Structure Maintenance	TSA	Project implementation
1.21	Acceptance of Timber Sale Erosion Control Measures Before Sale Closure	TSA, watershed specialist	Project implementation
1.22	Slash Treatment In Sensitive Areas	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
1.23	Five-Year Reforestation Requirement	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
1.24	Non-recurring C provisions that can be used for water quality protection	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
1.25	Modification Of The Timber Sale Contract	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
Road and Building Site Construction Practices			
2.1	General Guidelines For The Location And Design Of Roads	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.2	Erosion Control Plan	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.3	Timing of Construction Activities	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.4	Stabilization of Road Slope Surfaces and Spoil Disposal Areas	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.5	Road Slope Stabilization Construction Practices	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.6	Dispersion Of Subsurface Drainage From Cut and Fill Slopes	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.7	Control of Road Drainage	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.8	Constraints related to pioneer road construction	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.9	Timely Erosion Control Measures on Incomplete Roads and Stream crossing projects	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.10	Construction of stable embankments (fills)	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.11	Control of Sidecast Material during construction and maintenance	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.12	Servicing And Refueling Of Equipment	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.13	Control of Construction and maintenance activities adjacent to SMZs	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.14	Controlling In-channel Excavation	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.15	Diversion Of Flows Around Construction Sites	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.16	Stream crossings On Temporary Roads	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation

Standard Management Requirement (BMP)	Responsible person(s)	Timeframe
2.17 Bridge and culvert installation	IDT, Watershed specialist, prep officer, TSA	implementation Project planning, implementation
2.19 Disposal of right-of-way and roadside debris	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.20 Specifying riprap composition	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.21 Water source development consistent with water quality protection	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.22 Maintenance of Roads	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.23 Road Surface Treatment To Prevent Loss of Materials	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.24 Traffic Control During Wet Periods	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.25 Snow removal controls to avoid resource damage	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
2.26 Obliteration or decommissioning of roads	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
Vegetation Manipulation Practices		
5.2 Slope Limitations for Mechanical Equipment Operations	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
5.3 Tractor Operation Limitation in Wetlands and meadows	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
5.6 Soil Moisture limitations for Mechanical Equipment Operations	Watershed specialist, prep officer, TSA	Project planning, implementation
Fire Suppression and Fuels Management Practices		
6.1 Fire And Fuel Management Activities	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
6.2 Consideration of Water Quality In Formulating Fire Prescriptions	IDT, Fuels officer, Watershed specialist, prep officer, TSA	Project planning
6.3 Protection of water quality from prescribed burning effects	IDT, Fuels officer, Watershed specialist, prep officer, TSA	Project planning, implementation
Watershed Management Practices		
7.3 Protection of Wetlands	IDT, Watershed specialist, prep officer, TSA	Project planning, implementation
7.4 Oil And Hazardous Substance Spill Contingency Plan And Spill Prevention Control and Countermeasure (SPCC) Plan	Hazardous materials coordinator, Prep officer, TSA	Project planning, implementation
7.8 Cumulative Off-site Watershed Effects	IDT, Watershed specialist	Project planning, implementation

Site-specific measures that relate directly to these BMPs would be used on the Empire Project to minimize erosion and resultant sedimentation. The BMPs would also be used to minimize negative changes in other water quality parameters such as dissolved oxygen, water temperature, and turbidity. These measures follow the Scientific Analysis Team Guidelines for areas adjacent to stream courses, lakes and wetland areas. Protection and improvement measures would include minimizing disturbance of riparian zones, retention of snags for wildlife, stream shading, recruitment of large organic debris in stream channels, maintenance of side slope and stream channel stability, and prevention of an over accumulation of activity-generated organic debris in stream channels. Timber sale contracts contain many standard provisions that help ensure protection of soil and water resources. These include provisions for an erosion control plan, road maintenance, and skid trail spacing. The following measures, which were incorporated in the design of the action alternatives, would further reduce the risk of cumulative and local impacts on water quality and channel stability.

Botanical Resources and Noxious Weeds

These SMRs are displayed in the “Noxious Weed Risk Assessment for the Empire Vegetation Management Project.” This report is part of the Empire Project Record on file at the Mount Hough Ranger District; a copy is available upon request.

The following SMRs will greatly reduce the risk of noxious weed invasion and spread of existing populations. These SMR’s are consistent with the HFQLG FEIS (USDA Forest Service 1999a, USDA Forest Service 1999b), SNFPA FSEIS (USDA Forest Service 2004a, USDA Forest Service 2004b), USDA Forest Service Strategy for Noxious and Nonnative Invasive Plant Management (USDA Forest Service 1996), and Region 5’s Regional Noxious Weed Strategy (USDA Forest Service 2000). Furthermore, these SMR’s are the means by which the requirements of the FSM section 2081, Management of Noxious Weeds, are fulfilled.

The SMRs are ordered based on the priorities established in FSM 2081.2, which states, “Where funds and other resources do not permit undertaking all desired measures, address and schedule noxious weed prevention and control in the following order:

1. First Priority: Prevent the introduction of new invaders,
2. Second Priority: Conduct early treatment of new infestations, and
3. Third Priority: Contain and control established infestations.

Post implementation surveys of the Antelope Border DFPZ did not document noxious weeds (Merriam et al 2003), thus supporting the effectiveness of prevention SMR’s.

Prevent the introduction of new invaders:

Cleaning of off-road equipment: Require all off-road equipment and vehicles (Forest Service and contracted) used for project implementation to be weed-free. Clean all equipment and vehicles of all attached mud, dirt and plant parts. This will be done at a vehicle washing station or steam cleaning facility before the equipment and vehicles enter the project area. Cleaning is not required for vehicles that will stay on the roadway. Also, all off-road equipment must be cleaned prior to leaving areas infested with noxious weeds.

Road Construction, Reconstruction, and Maintenance: All earth-moving equipment, gravel, fill, or other materials need to be weed free. Use onsite sand, gravel, rock or organic matter where possible.

Revegetation: Use weed-free equipment, mulches, and seed sources. Avoid seeding in areas where revegetation will occur naturally, unless noxious weeds are a concern. Save topsoil from disturbance and put it back to use in onsite revegetation, unless contaminated with noxious weeds. All activities that require seeding or planting will need to use only locally collected native seed sources. Plant and seed material should be collected from as close to the project area as possible, from within the same watershed and at a similar elevation whenever possible. Persistent non-natives such as timothy, orchardgrass, or ryegrass should be avoided. This will implement the USFS Region 5 policy that directs the use of native plant material for revegetation and restoration for maintaining “the overall national goal of conserving the biodiversity, health, productivity, and sustainable use of forest, rangeland, and aquatic ecosystems. As necessary, Plumas National Forest botanists will develop

project and site-specific revegetation and seeding guidelines that will be customized from existing general guidelines.

Post project monitoring will facilitate the early detection of new populations and allow for developing proposals for treatment before populations get large.

Reduce the likelihood of spreading known infestations:

Staging Areas: Do not stage equipment, materials, or crews in noxious weed infested areas where there is a risk of spread to areas of low infestation.

Flag and Avoid known sites in project treatment units (see maps at end of this appendix).

Flag roadside locations along access roads to project treatment units. Incorporate practical and feasible measures such as performing work from uninfested areas into infested areas and washing equipment immediately after operating in infested areas, into road maintenance, reconstruction, and construction contracts to minimize the spread of noxious weeds by these activities.

Flag and Avoid noxious weed locations discovered during project implementation.

Noxious Weed Mitigations (Conduct early treatment of new infestations, and Contain and control established infestations)

Mitigation measures are designed to control known infestations within project treatment units and along project access roads. These are to be implemented as soon as appropriate based on species phenology (development patterns) after a decision is made on the project. Treatments should continue yearly during project implementation in order to prevent seed set and dispersal into suitable habitat created by project activities.

Chondrilla juncea (rush skeletonweed) A-rated

One small site of three plants is known along Rattlesnake Creek Road (PC 508 / 24N02X), an access road to project treatment units.

ACTION: Hand pull plants at known location to prevent seed set and further spread. Monitor all roads in immediate vicinity for more locations of rush skeletonweed.

Centaurea maculosa (spotted knapweed) A-rated

Two small locations near the railroad tracks at the end of Roundhouse Road.

This population is small so eradication from the site is a reasonable goal. Other noxious weeds in the area are yellow starthistle on PNF and private land and Scotch broom on private land. None of the weeds in this area are likely to be spread by project activities. Spotted knapweed has a stout taproot and can reproduce vegetatively from lateral roots. Because of this resprouting, hand pulling, digging, and other mechanical methods are generally not effective methods of eradication. While biological agents exist for the control of spotted knapweed they most likely will be ineffective for the same reasons discussed under the rush skeletonweed section above. Fire alone also is generally not effective because burned areas create optimal conditions for seed

germination, seeds last up to 10 years in the soil, and fire is usually not hot enough to kill the lateral roots which sprout new plants. However, fire in conjunction with herbicides is method that has been successful.

Action: Continue on-going treatment of hand pulling plants at known location to prevent seed set and further spread. Flag location for avoidance.

Centaurea solstitialis (yellow starthistle) C-rated

Yellow starthistle is a winter annual (seed germinates in late summer or fall; overwinters; grows, flowers, and sets seed the following spring and summer) known from over 52 locations within the vicinity of the project area and is common in American and Indian valleys. Seed dispersal is generally poor with most seeds falling within 2 feet of the mother plant. Dispersal distances over 16 ft. are mainly attributed to wildlife or anthropogenic factors. Although experimental results are variable, seeds remain germinable in the soil for 3 to ten years (DiTomaso 2004).

Quarry Road (25N14 / OHV route 51) is a main access route through the project area. The yellow starthistle population extends from Hwy 70 to the train bridge, about 1/10 mile. The potential for project related activities to spread the infestation are high.

Taylor Creek / 25N14. This is a small roadside population that has been hand pulled for two years.

Thompson Creek: This occurrence is along the La Porte Road just before the crossing of Thompson Creek and the intersection with the 24N26.

Berry Creek. This occurrence is small but dense. It is next to the creek and railroad tracks.

Johnson Hill. There are several known locations in this area.

Mt Hough Road. There are three roadside locations in this area that may be spread due to project related traffic. These locations have been hand pulled for the last two years.

Massack. Eleven locations along railroad tracks and between railroad tracks and 25N41 crosses Massack Creek.

Action: Utilize a combination of hand pulling, weed whacking, or flaming to prevent seed set.

Cirsium vulgare (bull thistle) listed but not yet rated

Bull thistle is also common along roads and in other disturbed locations on the PNF. Neither the Forest Service nor Plumas County actively manages populations of Canada thistle, bull thistle, or Klamathweed. Plants observed in the project area occur as scattered individuals not in large, dense stands. Bull thistle is a tap rooted annual or short lived perennial. It does not spread by rhizomes or other types of creeping rootstock.

Action: no species-specific management is necessary.

Convolvulus arvensis (field bindweed) C-rated

Field bindweed is known from one location in the project area, DFPZ unit #7 adjacent to railroad tracks.

Action: no species-specific management is necessary.

Cytisus scoparius (Scotch broom) C-rated

Scotch broom is known from 9 locations in the vicinity of the project. Six occurrences are on Forest Service lands and three are located on private land off of Roundhouse Rd. The Plumas NF will continue to work with the Plumas County Department of Agriculture to control weed occurrences on private land. The locations on FS lands include the following:

3 locations west of FS 25N12Y

2 locations in unit 28 north of FS 25N12 near Empire Mine

Action: Hand pull or weed wrench plants and monitor locations for seedlings.

1 location on the Cascade trail. The plant along the Cascade trail was pulled in 2004.

Action: Monitor location for seedlings and pull if located.

Hypericum perforatum (Klamathweed) C-rated

Klamathweed is common along roads and other disturbed areas within the project area. Neither the Forest Service nor Plumas County actively manages populations of Canada thistle, bull thistle, or Klamathweed. The biological control agents *Chrysolina quadrigemina* and *C. hyperici*, leaf-feeding flea beetles, and *Agrilus hyperici* a root-boring beetle, largely control Klamathweed. These biological control agents have reduced infestations by 97% to 99% since 1940 (California Department of Food and Agriculture 2004). Klamathweed is found along many Forest Service roads on the Plumas National Forest. Populations rarely form dense stands or invade the adjacent forest.

Action: rely on existing biological agents to control populations.

Taeniatherum caput-medusae (medusahead) C-rated

In the project area, medusahead is known to occur along the Mt Hough Road, in the vicinity of Quincy Junction, along the railroad tracks and adjacent lands from Massack to Johnson Hill, numerous locations along the 25N14, in DFPZ units 2, 7, 9 (rx only), 1 (mechanical harvest), and planning areas 11g, 14g, and 16g.

Action: Continue to implement the proposed medusahead control project or perform late spring underburns.

Noxious weed locations not affected by the action alternatives.

Cirsium arvense (Canada thistle) B-rated

Canada thistle is known from Berry Creek, Cashman Creek, a Cashman Creek tributary, Squirrel Creek, and Butterfly Valley Botanical Area. Neither the Forest Service nor Plumas County actively manages populations of Canada thistle, bull thistle, or Klamathweed. Canada thistle is a perennial, rhizomatus plant. This species is generally not managed because of the cost of available treatments. Some mechanical/physical treatments may spread the population rather than eradicate it (Bossard et al 2000). Repeated hand-pulling has been found effective in eradication of Canada thistle (Bossard et al 2000) and is currently being evaluated at the Butterfly Valley Botanical Area location. To date the 2,000 ft² area has been treated thirteen times in a two-year period taking 30-40 hrs and has produced little discernable impact to the population.

Action: Continue on-going treatment of hand pulling the plants at Butterfly Valley Botanical Area every two to three weeks during the growing season.

Centaurea solstitialis (yellow starthistle) C-rated

Oakland Camp. This area has been weed whacked for two years in conjunction with the Dancehouse RAC project and is flagged on the ground. Weeds at this location are unlikely to be spread by project activities.

Action: Continue current treatment i.e. flag and avoid area, continue to treat by weed whacking and hand pulling until eradicated.

Greenville wye, Hwy 70, Hwy 89. The roadside locations along these major routes are too extensive for treatments available to us at this time (hand pulling, mechanical). None of these weeds are likely to be spread by project activities.

Action: Work with Plumas County Agricultural Commissioner in developing a management plan for roadside weeds.

26N66. There are several locations along this road that will not be spread by this project.

Action: Incorporate these locations into a Forest/District long-term treatment plan.

Roundhouse Rd. Two large occurrences near railroad tracks. Spotted knapweed is nearby at the watertank (see above). Scotch broom and yellow starthistle are on private land south of the railroad tracks. None of the weeds in this area are likely to be spread by project activities.

Action: As funding allows, hand pull, flame, or mechanically treat locations. Flag for avoidance during road maintenance/reconstruction and other project related activities. Work with County for control of weeds on private land.

Lee Summit. The weeds at this location are unlikely to be spread by project activities.

Action: Work with CalTrans and Plumas County to develop a management plan for roadside weeds.

Cytisus scoparius (Scotch broom) C-rated

Roundhouse Rd.

Action: Work with County for control of weeds on private land.

Heritage Resources _____

These SMRs are displayed in the “Heritage Resource Report for the Empire Vegetation Management Project.” This report is part of the Empire Project Record on file at the Mount Hough Ranger District; a copy is available upon request.

- A. All proposed activities, facilities, improvements, and disturbances shall avoid heritage resource sites. “Avoidance” means that no activities associated with the project that may affect heritage resource sites shall occur within a site’s boundaries, including any defined buffer zones. Portions of the project may need to be modified, redesigned, or eliminated to properly avoid heritage resource sites.
- B. All heritage resource sites within the area of potential effect shall be clearly delineated prior to implementing any associated activities that have the potential to affect heritage resource sites.
- C. Buffer zones may be established to ensure added protection where the forest or district archaeologist determines that they are necessary. The use of buffer zones in conjunction with other avoidance measures are particularly applicable where setting contributes to the property’s eligibility under 36 CFR 60.4, or where it may be an important attribute of some types of heritage resource sites (e.g., historic buildings or structures; historic or heritage properties important to Native Americans). The size of buffer zones needs to be determined by the forest or district archaeologist on a case-by-case basis.
- D. When any changes in proposed activities are necessary to avoid heritage resource sites (e.g., project modifications), these changes shall be completed prior to initiating any activities.
- E. Monitoring during project implementation, in conjunction with other measures, may be used to enhance the effectiveness of protection measures.
- F. If heritage resources are inadvertently discovered during project implementation, the Mount Hough Ranger District archaeologist will be contacted immediately. The heritage resources will be recorded, clearly delineated, and protected.

Treatment Implementation _____

In fuel treatments, individual tree selection, and group selection harvests, pre-existing skid trails and landings will be used whenever available, feasible, and in a desirable location. In order to avoid loss of land base productivity, no more than 15 percent of timber stands shall be dedicated to landings and permanent skid trails (*Plumas National Forest Land and Resource Management Plan [PNF LRMP]*). In areas where pre-existing skid trails and landings are not present, construction of such facilities will occur as agreed upon by the Forest Service and purchaser. All landings and skid trails utilized shall conform to the standards and guidelines set forth in the Timber Sale Administration Handbook (FSH 2409.15) and the PNF LRMP.

Group selection harvest units adjacent to transportation infrastructure may be used as landings rather than creating new facilities. Group selection harvest units that are used as landings will be subsoiled accordingly and planted to appropriate conifer stocking levels.

Whole-tree yarding is proposed for fuel treatment, group selection, and individual tree selection harvests. Under a whole-tree yarding harvest system, individual trees are directionally felled using a mechanical cutting head attached to a tractor or similar unit. Smaller trees (less than 10 inches dbh) are cut, gathered in bunches, and left as “doodles” in the harvest unit; these smaller trees are not typically bucked or limbed within the unit. A rubber tired, track laying, or similar machine is then used to yard these doodles to the landing. At the landing, trees are limbed and bucked to specified lengths. Bucked log sections are loaded onto a log truck and transported to the mill; limbs are typically either chipped and hauled away to a cogeneration (power) plant or burned at the landing.

Occasionally, larger diameter trees (greater than 20 inches dbh) cannot be skidded in whole tree sections as these sections may exceed 100 feet. Typically, these sections are bucked to lengths of 40 feet and skidded to the landing individually. At the landing, they are limbed and further bucked to specification as needed and hauled to the mill. In some cases, the amount of limbwood on a tree may not allow skidding of the tree without damage to the residual stand. This usually occurs on butt logs that are greater than 20 inches in diameter. In this case, limbwood will be removed within the unit to facilitate skidding to the landing. Additional limbwood may break off along skid trails during skidding.

Treatment of this residual slash (after whole-tree yarding) created during harvests will be handled differently depending on treatment type. Within group selection units, slash will either be grapple piled and burned or underburned to prepare the site for planting. In individual tree selection units, slash treatment will include piling and burning, whole-tree yarding, slash chipping, and lopping/scattering limbs and treetops. Fuel treatment units will be evaluated after treatment, and areas that do not meet desired conditions with respect to surface fuels will be treated with underburning, pile burning, or other appropriate method.

Mastication will be implemented using a mastication head attached to an excavator, small tractor, or other type of machine (Coulter et al. 2002). The mastication head is used to chip or shred ladder fuels from brush and small trees (up to ~9 inches dbh) in place. Shredded material is incorporated into the duff layer during operations, left on site, or reduced using a follow prescribed burn following post treatment evaluation. Mastication is typically implemented in areas of high brush cover or that need ladder fuel treatment where biomass removal is not feasible.

Monitoring

DFPZ Maintenance Monitoring

Although the DFPZs were designed to remain effective for 10 years, monitoring will begin no later than 4 years after construction is completed.

The monitoring plan would be completed at least every two years thereafter. Results of this monitoring would be available to the public.

When surface fuel conditions reach a level of five to seven tons per acre, DPFZ maintenance activities may be necessary.

Heritage Resources

Monitoring during project implementation would be completed by district personnel.

Noxious Weeds

Monitoring during project implementation would be completed by district personnel.

HFQLG Pilot Project

The Empire Vegetation Management Project, as part of the HFQLG Pilot Project, will be incorporated into this larger, pilot project-wide monitoring.

The HFQLG Pilot Project Monitoring Plan was initiated in fiscal year (FY) 2000 and provides a structure, in the form of questions, to gain information about (1) habitat concerns, (2) effects of implementing pilot project activities, (3) effectiveness of those activities, and (4) economic well-being. The monitoring plan, which includes a full description of these questions and their monitoring protocols, is available in the Empire Project Record.

The “Habitat Concerns” section includes methods to assess habitat connectivity, old forest habitat, and aquatic/riparian-dependent species monitoring. This section meets the requirement in the 1999 HFQLG Final Environmental Impact Statement (FEIS) Record of Decision that states, “over the course of the Pilot Project, suitable habitat for old-forest-dependent species and aquatic/riparian-dependent species (including amphibians) shall not be reduced by more than ten percent below 1999 levels.”

The “Implementation Monitoring” section has three levels of assessment: project evaluations, interagency project reviews, and topic specific questions. This section provides information about the degree to which treatments are implemented according to standards and guidelines set forth in the HFQLG Act FEIS, each forest’s land management plan, and site-specific direction. There are 10 topic-specific questions concerning forest structure, best management practices, soil quality, sensitive plants, noxious weeds, and air quality. These questions include information on objectives, scale, monitoring protocol, and estimated cost.

In the “Effectiveness Monitoring” section, 21 topic-specific questions address: (1) old-forest values and old-forest-dependent species; (2) watershed effects; (3) wildfire protection and fuels reduction; (4) threatened, endangered, and sensitive plants, and (5) noxious weeds. These questions assess the degree to which implemented treatments meet resource objectives. The topic-specific questions also include information on objectives, scale, monitoring protocol, and estimated cost.

The “Economic Well-Being” section has been contracted to the Center for Economic Development in Chico, CA, to collect and analyze data.

Plumas-Lassen Administrative Study

The Empire Vegetation Management Project is incorporated into the Plumas-Lassen Administrative Study, also known as the “case study.” This study is interdisciplinary, examining at least five groups of response variables (spotted owls, small mammals, terrestrial birds, vegetation, and fuels conditions) through collaboration between researchers of the USDA Forest Service Pacific Southwest Research Station and cooperators from the University of California–Berkeley and Davis, and the Point Reyes Bird Observatory. The study addresses some of the most significant uncertainties that confound management decision in the Sierra Nevada today, including in the HFQLG Pilot Project area. How do old-forest-dependent species respond to vegetation management over space and time? Do fuels management approaches effectively address fuels loadings without negatively affecting species viability? How effective are landscape level fuels management strategies in modifying fire behavior and reducing the extent and severity of wildland fire? These and related questions are the focus of the work being done in this study. A copy of the study is in the Empire Project Record

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Appendix G
Past, Present, and Reasonably Foreseeable Future
Projects

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Appendix G - Past, Present, and Reasonably Foreseeable Future Actions

Wildland Fires

There were 418 wildfires in the wildlife analysis area from 1970 to 2001. The fires ranged from 0.1 acre to approximately 1,600 acres. Eight fires were greater than 10 acres.

There were 355 fires in the subwatersheds from 1970 to 2001, ranging in size from less than 1 acre to over 1,600 acres. Of these 355 fires, 159 were lightning caused; the remaining 196 were human caused. Between 1916 and 2003, 22 fires have exceeded 100 acres in size, burning over 14,000 acres or approximately 14 percent of the 103,000-acre Empire Vegetation Management Project (Empire Project) area.

Recreation

Most of the recreational use in the Empire Project boundaries is by individuals and small groups participating in dispersed activities that include hiking, horseback riding, mountain biking, Christmas Tree cutting, dirt biking, pleasure driving, ATV riding, hunting, fishing, camping, rock hounding and mining, and firewood gathering.

There are two developed campgrounds:

Spanish Creek – Located 8 miles north of Quincy. Section 15, T25N, R9E. Approximately 1,000 campers used the campground from July 1st to October 15th in 2004. This was the first year the campground was fully developed. It is estimated that in the future, about 2,000 campers will visit the site from May 1 through October 15.

Brady's Camp – Sits just below the top of Grizzly Ridge, slightly to the north and east of Argentine Rock, in the SW 1/4, Section 9, T 24 N, R 11 E. Approximately 100 campers use Brady's Camp from June 1 through October 15, mainly by deer hunters in September and October.

There are over 70 mining claimants and 45 placer mining claims along the creeks. The time frame for dredging season is from the third week of May through October 15 each year.

There is a developed OHV track, with unloading ramp and trailhead at Four Corners, 0.25 mile west from the junction of FS 25N14 and County Road 403. Approximately 200 to 250 people use this track each year, and use is increasing. It is a fairly new development (reconstructed in 2003), so the Forest Service expects the track will be discovered by more users as time passes. There are six designated off-highway vehicle routes within the Empire Project boundaries. The routes are comprised of approximately 103 miles, and about 50 to 100 people use the routes each year. This area is used heavily by horseback riders, dirt-bike riders, and ATV users, and it is estimated that about 50 to 75 mountain bikers use the routes each year.

Permits, Mount Hough Ranger District

Personal Use Woodcutting

The following shows the number of woodcutting permits sold; woodcutting is allowed throughout the Plumas National Forest.

2001 – 998 permits for 2,572 cords.

2002 – 938 permits for 2,401 cords.

2003 – 819 permits for 2,154 cords.

2004 – 758 permits for 2,400 cords

Commercial Woodcutting

2001 – 17 permits for 160 cords.

2002 – 15 permits for 135 cords.

2003 – 15 permits for 90 cords.

2004 – 19 permits for 95 cords.

Christmas Tree Permits

The following shows the number of permits sold; cutting is allowed throughout the Plumas National Forest.

2001 – 2,062

2002 – 2,348

2003 – 2,182

2005 – 2,124

Grazing Allotments

The Long Valley allotment overlaps onto subwatershed 033 and the wildlife analysis area. The allotment is vacant.

The Bear Creek allotment overlaps onto the wildlife analysis area. However, due to topography, cattle do not enter the analysis area portion of the allotment.

Hunters

The deer tag quota for Zone X6A is approximately 380 (2005). The season runs for approximately three weeks in October.

Special Use

There are 43 Special Use Permits in the wildlife analysis area and the subwatersheds. The Special Use Permits are for road use, TV antennas, a cemetery, power and telephone lines, microwave antennas, waterlines, reflectors, livestock areas, organizational camps, residences, irrigation and domestic waterlines, and horse trails.

Table G.1 displays the acres of timber harvest activities on private land in the wildlife analysis area. The acreages come from a summary of the Timber Harvest Plans.

Table G.2 displays the acres of Forest Service activities in the wildlife analysis area. The acreages come from timber sale stand record information.

Table G.3 displays the acres of timber harvest activities on private land in the subwatersheds. The acreages come from a summary of the Timber Harvest Plans.

Table G.4 displays the acres of Forest Service activities in the Diamond project area. The acreages come from timber sale stand record information.

Figures G.1 and G.2 display the cumulative effects analysis areas for vegetation, fuels, wildlife and watershed resources.

Table G.1. Timber harvest activities on private land in the wildlife analysis area.

Year	Shelterwood Seed	Comm. Thin	Selection	Shelterwood Removal	Group Selection	Clearcut	Sanitation Salvage	Rehab	Seed Tree Removal
1994	0	553	95	52	0	26	0	13	0
1995	0	931	287	88	0	226	927	66	0
1996		131	106	77	0	0	0	0	60
1997	0	117	90	7		0	0	59	0
1998	251	878	217	30	0	215	1,155	0	0
1999	0	0	0	0	0	0	0	0	0
2000	0	38	36	469	4	0	0	0	0
2001	20	981	41	20	49	139	0	0	0
2002	0	703	83	306	0	434	0	101	0
2003		85	5	0	0	249	0	0	0

Table G.2. Forest Service activities in the wildlife analysis area, 1969 through 2004.

Activity	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Underburn													17				12				
Burn Piles											78			10							
Hand Piling																					
Tractor Piling																					
Clearcut								12			15	62	28		562	27	59	167	245	110	117
Shelterwood Seed Cut																0		74	246		
Overstory Removal				406		6		82			80	83	11	7	295	32	33	6	124	39	169
Selection	158	896		31	166						33				67		51			79	61
Group Selection																					
Salvage																			5		10
Sanitation																20	97	21	55	24	
Salvage Cull																					9
Planting		6	76			60	3		163		495	66	103	66		34		62	113		97
Site Prep - Burning												142								4	10
Site Prep - Mechanical						4			15			67		20		143					13
Site Prep - Manual										52										7	37
Release							55							23	29		44	33			
Precommercial Thinning						116	44				216	528	20		79			181			140
Hand Thinning																					
Mechanical Thinning																					
Activity	1990	1991	1992	1993	1994	1995	1996	1997	1998	2002	2004										
Underburn										26											
Burn Piles				67	23																
Hand Piling	11																				
Tractor Piling	24																				
Clearcut	88	59	325																		
Shelterwood Seed Cut																					

Table G.3. Timber harvest activities on private land (continued).

Overstory Removal	468	209																	
Selection	52	161																	
Activity	1990	1991	1992	1993	1994	1995	1996	1997	1998	2002	2004								
Group Selection		110																	
Salvage	272	165	151		39	2	4	16											
Sanitation		13																	
Salvage Cull																			
Planting	18	90		76	61	20	59												
Site Prep - Burning	18	11																	
Site Prep - Mechanical	46				78														
Site Prep - Manual	15	30		84															
Release		25				41													
Precommercial Thinning	101	76			178	48			11										
Hand Thinning												288							
Mechanical Thinning												95							

Table G.3. Timber harvest activities on private land.

Subwatershed	Year	Shelterwood Seed	Commercial Thinning	Selection	Shelterwood Removal	Group Selection	Clearcut	Sanitation/ Salvage	Rehabilitation	Seed Tree Removal
001	1998			52						
003	1994		9	0	7					
003	1996		76	76	289					
003	1997		1							
003	2001	17			35					
003	2003			357						
004	1994		30							
004	1995			32						
004	2000		82							
005	1998	5	2	40	70	61	4			12
008	1994			52	3					
008	1996				9					
008	1997		18	13					10	
008	1998		8							
008	2000		35							
008	2003		29	5			15			
009	1996		16		6					
010	1998		5		33					
012	1994				2					
012	1997		13	7					6	
013	1996				3					
016	1994				2					
016	1995		10		10					
016	1997		85	68					43	
016	2001									
016	2003		54	3		36	24			
017	1996		41	64	10					36

Table G.3. Timber harvest activities on private land (continued).

Subwatershed	Year	Shelterwood Seed	Commercial Thinning	Selection	Shelterwood Removal	Group Selection	Clearcut	Sanitation/ Salvage	Rehabilitation	Seed Tree Removal
018	2002		7	1			2		2	
019	1994		71	38			7		20	2
019	1997		3		67		4			
019	2002		20	2			3		6	
020	1995		1		11					
020	2002		266	20			45		80	
021	2002		52	4	144		6		12	
022	1994		35	18	3		5		9	
022	1997		2		23		4			
023	1997		1		71					
023	1998	160	96							
023	1999				12					
023	2000				10					
024	1994		1	1	4					
024	1995		174	49	1		45	185	13	
024	2000			5		1				
024	2003						41			
025	1995			3						28
025	1997		1		20					
025	1998		81				26			
025	2002		20	1			3		6	
026	1995			5						43
026	1998		123		14		40			
027	1998		60				21	115		
027	2002		5		66					
028	1998		492				182	981		
029	1995		20	17						
029	1998		30				10	57		
029	2001		346				62	554		
029	2002		20	2			113			

Table G.3. Timber harvest activities on private land (continued).

Subwatershed	Year	Shelterwood Seed	Commercial Thinning	Selection	Shelterwood Removal	Group Selection	Clearcut	Sanitation/ Salvage	Rehabilitation	Seed Tree Removal
030	2000		5		183					
030	2001		346				182	981		
030	2002		20	2			113			
031	1995		277				42	72		
031	1996				9					
031	1998				9					
031	1999		417	943		1	170	276		
031	2002		99	18	16		113			
032	1996				9					
032	2001		77				13	123		
032	2002		8		273					
033	1998				9					
033	1999		180	407			73	119		
033	2002		185	38	38					

Table G.4. Forest Service activities in the Empire project area, 1966 through 2004.

Activity	1966	1969	1970	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Activity Fuels Broadcast Burn						30															
Activity Fuels Jackpot Burn						25	65														
Activity Fuels Underburn													14	50	240					240	
Area release and weeding																	31	7			
Burn of Activity Fuels Piles								12			21	85	13	6						2	15
Burning site preparation for planting													25			39				186	61
commercial thin dancehouse																					
Group selection cut					14																34

Table G.4. Forest Service activities in the Empire project area, 1966 through 2004 (continued).

Activity	1966	1969	1970	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Individual tree release and weeding							20														
Mechanical site preparation for planting						5		12	10	43	45	64	7	22		143	44		8	40	
Other site preparation for planting																					
Overstory removal cut			13	441		160		80		73	227	436	69		746	107	78	189	402	38	153
Patch clearcutting								12			15	37			222	27	29	31	20	61	73
Permanent Land Clearing																					30
Piling of Activity Fuels																					
Precommercial thinning - individual or selected trees																96					284
Salvage cut			366	64													161				13
Sanitation (salvage)									406												
Sanitation Cut															11	9	0	27	7		
Seed-tree seed cut															30			58	88		36
Single-tree selection cut	73	345	848	100	250						276				84		7		11	1.12	111
Site preparation for planting																2				2	13
Stand clearcutting (w/reserve)													6		301			75			
Stand Clearcutting												25	22		39		30	61	225	49	44
Wildlife Habitat Prescribed fire																	18				
Activity	1990	1991	1992	1993	1994	1995	1996	1997	2002	2004											
Activity Fuels Broadcast Burn																					
Activity Fuels Jackpot Burn																					
Activity Fuels Underburn			60						60												
Area release and weeding						201															
Burn of Activity Fuels Piles		26	30																		
Burning site preparation for planting		37																			
commercial thin dancehouse										31											

Table G.4. Forest Service activities in the Empire project area, 1966 through 2004 (continued).

Group selection cut																					
Activity	1990	1991	1992	1993	1994	1995	1996	1997	2002	2004											
Individual tree release and weeding																					
Mechanical site preparation for planting	11	48			141																
Other site preparation for planting	11	123	7	176																	
Overstory removal cut	612	286	255																		
Patch clearcutting	6																				
Permanent Land Clearing																					
Piling of Activity Fuels	57																				
Precommercial thinning - individual or selected trees						147															
Salvage cut																					
Sanitation (salvage)	120	195	19		4		10	102													
Sanitation Cut		16																			
Seed-tree seed cut	49																				
Single-tree selection cut	95	172	79																		
Site preparation for planting					36																
Stand clearcutting (w/reserve)	27	59	284																		
Stand Clearcutting	55		41																		
Wildlife Habitat Prescribed fire																					

Future Activities

The Empire Project Record contains a table that displays the Forest Service activities in the subwatersheds.

Some future activities are listed below.

2005	Dancehouse- Chandler Fuel Treatment Project	Approximately 33 acres of mechanical thinning in subwatershed 019, and approximately 50 acres of handpile burning and 250 acres of underburning. Subwatershed 014 – 75 acres of underburning; subwatershed 015 – 15 acres of underburning; subwatershed 018 – 80 acres of underburning; and subwatershed 019 – 80 acres of underburning. Approximately 25 acres of handpiling in subwatershed 018 and 25 in subwatershed 019.
2005– 2006	Old Sloat Fuels Reduction Project	Mechanical thinning approximately 160 acres and 100 acres of maintenance hand thinning and burning. Sections 2, 3, and 10, T23N, R11E. This is located in the wildlife analysis but not within any of the subwatersheds.
	DFPZ maintenance	Future DFPZ maintenance is not proposed at this time. However, it is included in the cumulative effects section of the EIS as a possible future event. The following predicted maintenance treatments include approximately 6,034 acres of prescribed fire, 222 acres of mechanical treatment, and 380 acres of hand treatment for Alternative A. Alternatives C and D are predicted to include approximately 6,000 acres of prescribed fire, 230 acres of mechanical treatment, and 380 acres of hand treatment. Maintenance activities could occur at least 10 years after implementation.
2005	Roadside hazard sale	Approximately 5 acres of roadside hazard removal in subwatershed 030 – is in the wildlife analysis areas. Majority of the project is on the Beckwourth Ranger District.
2005– 2010	Wildlife habitat improvement projects	About 12 guzzlers would be installed in the wildlife analysis area. These guzzlers would be located in the following subwatersheds: 002 – 1 guzzler; 011 – 1; 013 – 2; 014 – 1; 015 – 1; 018 – 1; 019 – 1; 025 – 2; 026 – 1; 031 – 1. Two waterholes would be developed in the wildlife analysis area. One waterhole would be developed in subwatershed 010 and one in 011.
2006	Rhinehart Meadow OHV restoration	Barriers would be installed to prohibit vehicle access. This project includes rock barriers to prohibit vehicle access, meadow and stream restoration, and OHV interpretive signage.
	Routine maintenance / suppression	Routine road maintenance and suppression of wildland fires.
	Corridor Fuel Reduction Project	About 100 acres out of 550 acres within Empire Project area. Treatments include mechanical thinning, hand thinning, pile burning, chipping, and underburning.
2005– 2010	Medusahead Treatment	After the initial treatment, the sites would be monitored and retreated over a 5-year period. Medusahead would be treated using a heat treatment, which would kill the target plant but not ignite them. Sections 30, 31, 32, 33, and 34, T25N, R10E; sections 3, 4, 5, 6, 9, 16, 22, and 23, T24N, R10E.

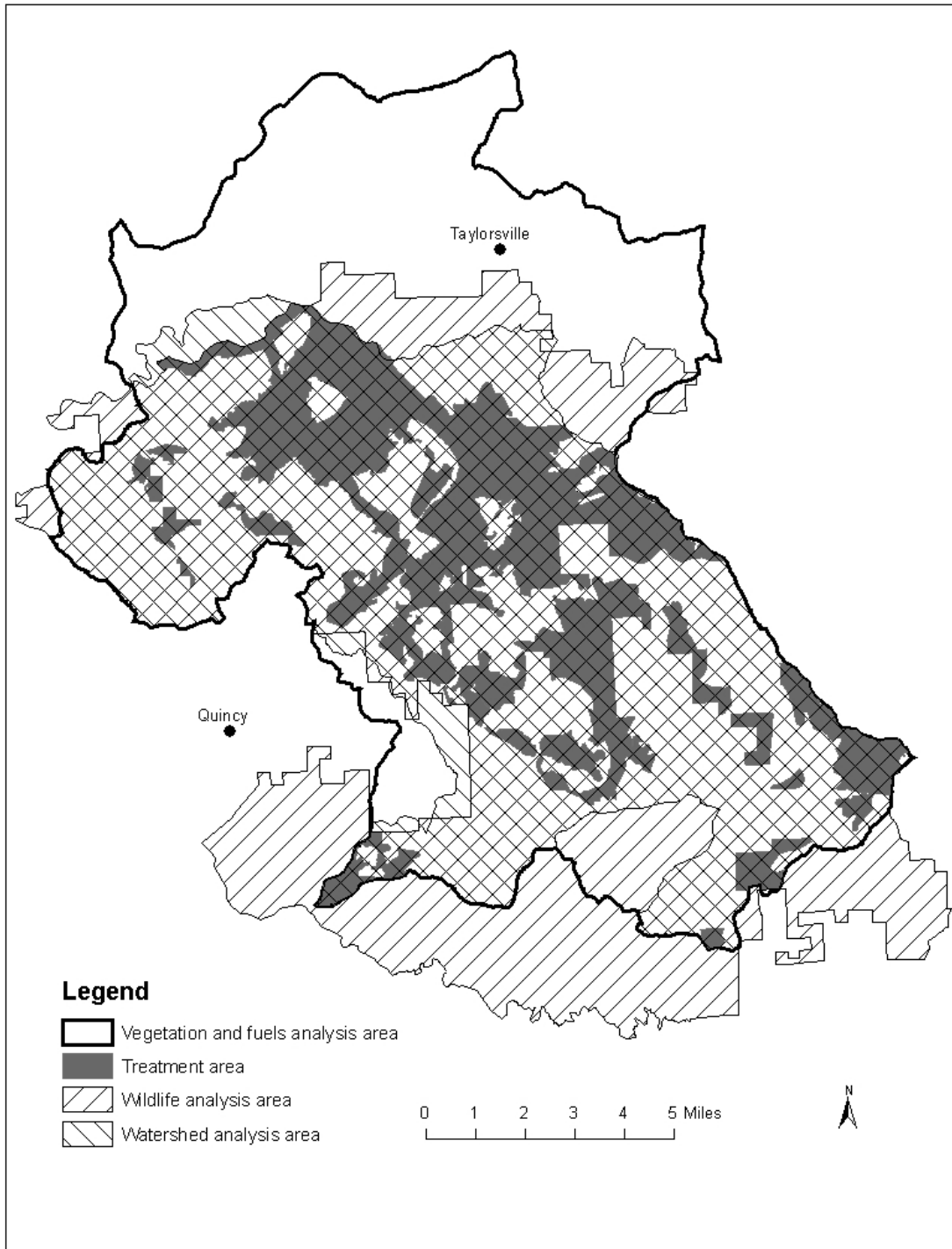


Figure G.1. Cumulative effects analysis areas, for vegetation, fuels, wildlife and watershed resources.

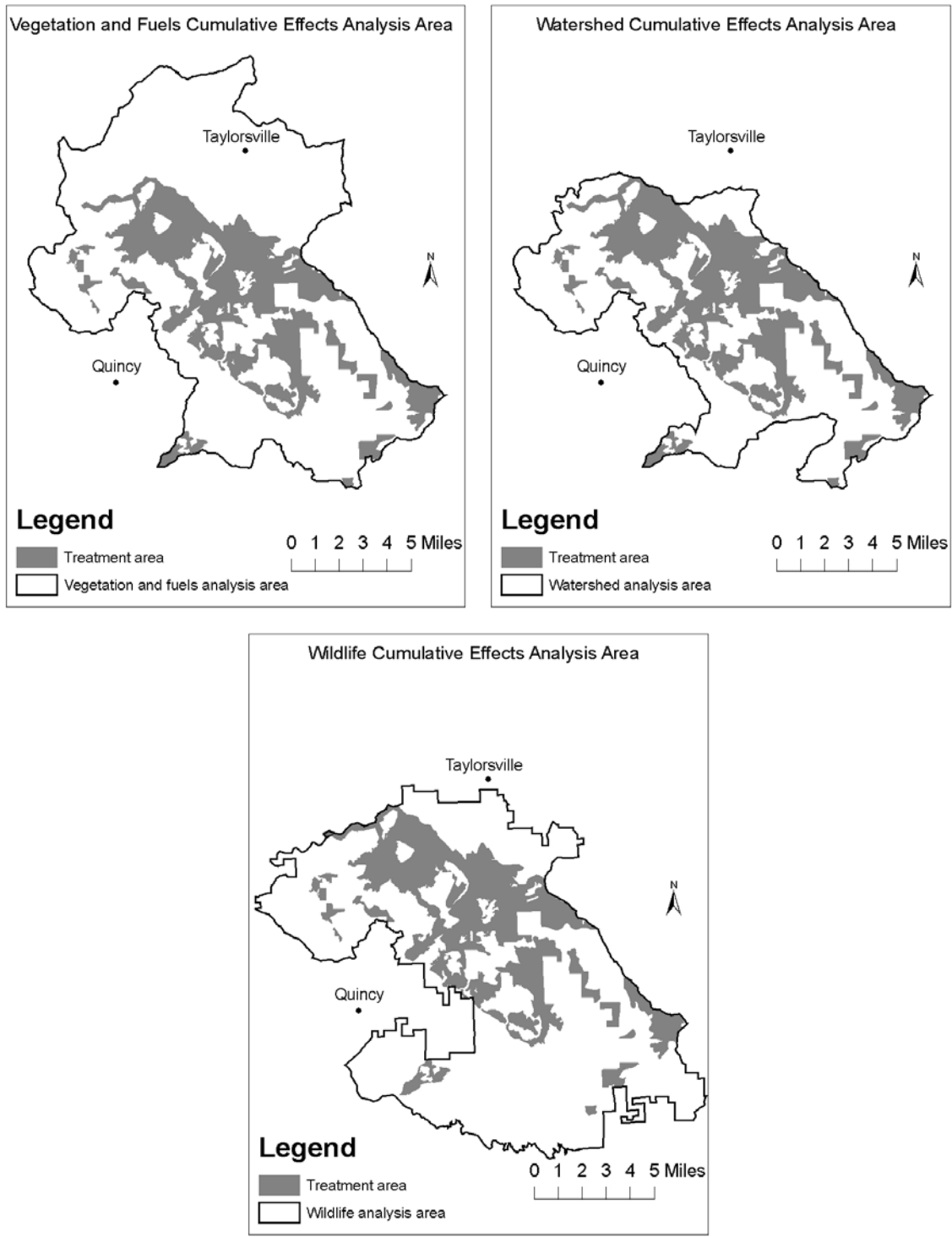


Figure G.2. Side by side display of the cumulative effects analysis areas for vegetation, fuels, wildlife and watershed resources.

Appendix H

Economic Analysis

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Appendix H Economic Analysis

The following assumptions apply to the economic analyses for each alternative, as shown on the tables below.

Assumptions

* Harvest Value Schedules, CA State Board of Equalization, Table 4, Area 7, Tractor, 23 inches–29.9 inches dbh

** Harvest Value Schedules, CA State Board of Equalization,, Misc. Harvest Values, Small Sawlogs, 14 inches–22.9 inches dbh

*** Timber Values for 10 inches–13.9 inches are \$25, under 2 MBF/ac - \$50

Deduction if average volume per acre under 5mbf/ac – \$25/mbf

Skyline Yarding \$30/mbf for 23 inch–29.9 inch (25% of volume) \$80/mbf for 14 inches–22.9 inches (75% of volume)

Cost/ac for unit size increases 0% for 400 ac to 20% for 5 ac

Cost/ac for contract length decreases 10% every year after one year

Cost/ac for months of operation decreases 10% for 10 months or more and increases 10% for 4 months or less

Based on historical relationships between employment and harvest in California during the 1980s, each million board feet harvested supports 6.5 year-around jobs (1 in logging, 4 in sawmill, and 15 in US Forest Service employment). In regional economic models of employment for California and the Pacific Northwest, and estimate of one indirect or induced job for every direct timber job is added. Indirect jobs result from the employment created by the local purchase of materials for the sawmill, local expenditures by workers, and the demand for local government employees. Each million board feet harvested supports a total of 13 jobs that are timber related. The restoration and fuel work would support additional direct and indirect employment. There are approximately 1.4 indirect jobs for every full time field job. All jobs are equivalent to year-around employment.

ECONOMIC ANALYSIS						
Empire Alternative "A"						
7/29/2006						
VALUE - Groups			Total Acres = 8661 acres			Low mbf/\$0
PP 23"-29.9" sawtimber *	4.1%	712	mbf X (\$400/mbf + \$0/mbf)			\$284,971
SP 23"-29.9" sawtimber *	6.5%	1129	mbf X (\$400/mbf + \$0/mbf)			\$451,784
WF 23"-29.9" sawtimber *	17.0%	2954	mbf X (\$200/mbf + \$0/mbf)			\$590,794
DF 23"-29.9" sawtimber *	5.4%	938	mbf X (\$410/mbf + \$0/mbf)			\$384,711
IC 23"-29.9" sawtimber *	2.3%	400	mbf X (\$460/mbf + \$0/mbf)			\$183,841
ALL 10"-22.9" sawtimber **	64.7%	11242	mbf X (\$130/mbf + \$0/mbf)			\$1,461,521
		17376.3	mbf	12.9	mbf/acre	
Biomass Value when Removed		858	acres X 18.1 tons/acre X \$11.50/ton =			\$178,495
VALUE - DFPZ			Total Acres = 3314			Low mbf/(\$25)
PP 23"-29.9" sawtimber *	1.2%	58	mbf X (\$400/mbf + (\$25)/mbf)			\$21,651
SP 23"-29.9" sawtimber *	1.8%	92	mbf X (\$400/mbf + (\$25)/mbf)			\$34,325
WF 23"-29.9" sawtimber *	4.8%	239	mbf X (\$200/mbf + (\$25)/mbf)			\$41,894
DF 23"-29.9" sawtimber *	1.5%	76	mbf X (\$410/mbf + (\$25)/mbf)			\$29,277
IC 23"-29.9" sawtimber *	0.7%	32	mbf X (\$460/mbf + (\$25)/mbf)			\$14,089
ALL 10"-22.9" sawtimber **	90.0%	4474	mbf X (\$130/mbf + (\$25)/mbf)			\$469,760
		4971	mbf	1.5	mbf/acre	
Biomass Value when Removed		3314	acres X 18.1 tons/acre X \$11.50/ton =			\$689,809
VALUE - ITS			Total Acres = 4000			Low mbf/(\$25)
PP 23"-29.9" sawtimber *	1.2%	46	mbf X (\$400/mbf + (\$25)/mbf)			\$17,422
SP 23"-29.9" sawtimber *	1.8%	74	mbf X (\$400/mbf + (\$25)/mbf)			\$27,620
WF 23"-29.9" sawtimber *	4.8%	193	mbf X (\$200/mbf + (\$25)/mbf)			\$33,711
DF 23"-29.9" sawtimber *	1.5%	61	mbf X (\$410/mbf + (\$25)/mbf)			\$23,558
IC 23"-29.9" sawtimber *	0.7%	26	mbf X (\$460/mbf + (\$25)/mbf)			\$11,337
ALL 10"-22.9" sawtimber **	90.0%	3600	mbf X (\$130/mbf + (\$25)/mbf)			\$378,000
		4000	mbf	1.0	mbf/acre	
Biomass Value when Removed		350	acres X 18.1 tons/acre X \$11.50/ton =			\$72,853
TOTAL VALUE			26347 mbf			\$5,401,424
Total Biomass 1000 tons	168	82				
COSTS	28		(Assumes Harvesting Sawtimber and Biomass in One Operation)			
Add sawtimber skyline cost	196	2790	mbf X \$62/mbf =			\$172,980
Additional Cost	111	1431.9	mbf X \$250/mbf			\$357,975
Additional Cost		1590	mbf X \$20/mbf			\$31,800
		Average Unit Size =	50 acres	\$24/acre		
		Contract Length =	2 years	(\$24)/acre		
		Months Operation =	5 months	\$0/acre		
Acres of 6"-9.9" biomass-tractor		0	acres X (\$245/acre + \$0/acre)			\$0
Acres of 3"-9.9" biomass-tractor		4522	acres X (\$281/acre + \$0/acre)			\$1,270,550
Acres of 6"-9.9" biomass-skyline		0	acres X (\$1,000/acre + \$0/acre)			\$0
Acres of 3"-9.9" biomass-skyline		30	acres X (\$2,000/acre + \$0/acre)			\$60,000
		4552	Biomass Acres			
# of sawtimber loads		26347	mbf / 4 mbf/truck	6587		
Additional Haul Cost (4 hr avg)		0	hours/trip X \$50/hour X 6587 trips			\$0
# of biomass loads	###	acres X	18.1 tons/acr	25 tons/truck	3295	
Haul Cost Biomass		4	hours/trip X \$50/hour X 3295 trips			\$659,000
Surface Replacement-sawtimber		26347	mbf X \$2.00/mbf =			\$52,695
Surface Replacement-biomass		4552	acres X 18.1 tons/acre X 0.33/ton =			\$27,461
Subsoiling Costs		400	acres X \$230/acre			\$92,000
BD Costs		26347	mbf X \$2.00/mbf			\$52,695
Road Construction-New		3.0	miles X 35,000/mile			\$105,000
Road Construction-Recon		113.0	miles X 7,000/mile			\$791,000
Temporary Road Construction		6.2	miles X 5,000/mile			\$31,000
Advertised Rate-sawtimber		26347	mbf X \$35.23/mbf			\$928,292
Advertised Rate-biomass		4552	acres X 18.1 tons/acre X \$0.20/ton			\$16,477
Yield Tax		\$5,401,424	X 2.9%			\$156,641
Scaling Sawtimber		6587	trips X \$17/trip			\$111,979
Scaling Biomass		3295	trips X \$3/trip			\$9,885
TOTAL COST						\$4,927,429
NET VALUE						\$473,995
			PERCENT ABOVE VALUE			9%
Groups:				Acres/job	Full Time Jobs	
Reforestation Costs		909	acres X \$775/acre	110	18	\$704,649
Grapple Pile		210	acres X \$820/acre	120	4	\$172,584
Hand line and Underburn		84	acres X \$450/acre	400	0	\$37,884
						\$915,118
DFPZ:						
Grapple Pile		300	acres X \$250/acre	120	6	\$75,000
Hand Pile and Burn		50	acres X \$500/acre	120	1	\$25,000
Hand line and Underburn		1000	acres X \$150/acre	400	6	\$150,000
Mastication		500	acres X \$400/acre	120	9	\$200,000
Road Decommissioning		15.6	miles X \$5000/mile	40	1	\$78,000
EA/Prep						\$750,000
TOTAL NON-HARVEST COST						-\$1,278,000
Reduced Fire Suppression Cost						\$1,500,000
TOTAL PROJECT VALUE						\$695,995
Harvest/Biomass				350		
TOTAL FULL TIME JOBS						394
TOTAL EMPLOYEE-RELATED INCOME						\$16,957,187
Assumptions:						
* Harvest Value Schedules, CA State Board of Equalization, Table 4, Area 7, Tractor, 23"-29.9" dbh						
** Harvest Value Schedules, CA State Board of Equalization, Misc. Harvest Values, Small Sawlogs, 14"-22.9" dbh						
*** Timber Values for 10"-13.9" are \$25.00/mbf						
Deduction if average volume per acre under 5mbf/acre -\$25, under 2mbf/acre -\$50						
Skyline Yarding \$30/mbf for 23"-29.9" (25% of Volume) \$80/mbf for 14"-22.9" (75% of Volume)						
Cost/acre for unit size increases 0% for 400 ac to 20% for 5 ac						
Cost/acre for contract length decreases 10% every year after one year						
Cost/acre for months of operation decreases 10% for 10 months or more and increases 10% for 4 months or less						
Based on historical relationships between employment and harvest in California during the 1980's, each million board feet harvested supports 6.5 year-around jobs (1 in logging, 4 in sawmill, and 1.5 in US Forest Service employment). In regional economic models of employment for California and the Pacific Northwest, and estimate of one indirect or induced job for every direct timber job is added. Indirect jobs result from the employment created by the local purchase of materials for the sawmill, local expenditures by workers, and the demand for local government employees. Each million board feet harvested supports a total of 13 jobs that are timber related. The restoration and fuel work would support additional direct and indirect employment. There are approximately 14 indirect jobs for every full time field job. All jobs are equivalent to year-around employment						

ECONOMIC ANALYSIS						07/29/06
Empire Alternative "C"						
		Total Acres =	8914	acres		
VALUE - Groups			Total Acres =	1600	Low mbf/\$0	
PP 23"-29.9" sawtimber *	41%	984	mbf X	(\$400 /mbf + \$0 /mbf)	\$393,600	
SP 23"-29.9" sawtimber *	6.5%	1560	mbf X	(\$400 /mbf + \$0 /mbf)	\$624,000	
WF 23"-29.9" sawtimber *	17.0%	4080	mbf X	(\$200 /mbf + \$0 /mbf)	\$816,000	
DF 23"-29.9" sawtimber *	5.4%	1296	mbf X	(\$410 /mbf + \$0 /mbf)	\$531,360	
IC 23"-29.9" sawtimber *	2.3%	552	mbf X	(\$460 /mbf + \$0 /mbf)	\$253,920	
ALL 10"-22.9" sawtimber **	64.7%	15528	mbf X	(\$130 /mbf + \$0 /mbf)	\$2,018,640	
Biomass Value when Removed		20640	mbf	12.9	mbf/acre	
		1168	acres X	18.1	tons/acre X	\$11.50 /ton = \$243,119
VALUE - DFPZ			Total Acres =	3314	Low mbf/(\$25)	
PP 23"-29.9" sawtimber *	12%	58	mbf X	(\$400 /mbf + (\$25)/mbf)	\$21,651	
SP 23"-29.9" sawtimber *	1.8%	92	mbf X	(\$400 /mbf + (\$25)/mbf)	\$34,325	
WF 23"-29.9" sawtimber *	4.8%	239	mbf X	(\$200 /mbf + (\$25)/mbf)	\$41,894	
DF 23"-29.9" sawtimber *	1.5%	76	mbf X	(\$410 /mbf + (\$25)/mbf)	\$29,277	
IC 23"-29.9" sawtimber *	0.7%	32	mbf X	(\$460 /mbf + (\$25)/mbf)	\$14,089	
ALL 10"-22.9" sawtimber **	90.0%	4474	mbf X	(\$130 /mbf + (\$25)/mbf)	\$469,760	
Biomass Value when Removed		4971	mbf	1.5	mbf/acre	
		3314	acres X	18.1	tons/acre X	\$11.50 /ton = \$689,809
VALUE - ITS			Total Acres =	4000	Low mbf/(\$25)	
PP 23"-29.9" sawtimber *	12%	93	mbf X	(\$400 /mbf + (\$25)/mbf)	\$34,875	
SP 23"-29.9" sawtimber *	1.8%	147	mbf X	(\$400 /mbf + (\$25)/mbf)	\$55,125	
WF 23"-29.9" sawtimber *	4.8%	385	mbf X	(\$200 /mbf + (\$25)/mbf)	\$67,375	
DF 23"-29.9" sawtimber *	1.5%	122	mbf X	(\$410 /mbf + (\$25)/mbf)	\$46,970	
IC 23"-29.9" sawtimber *	0.7%	52	mbf X	(\$460 /mbf + (\$25)/mbf)	\$22,620	
ALL 10"-22.9" sawtimber **	90.0%	7200	mbf X	(\$130 /mbf + (\$25)/mbf)	\$756,000	
Biomass Value when Removed		4000	mbf	1.0	mbf/acre	
		350	acres X	18.1	tons/acre X	\$11.50 /ton = \$72,853
TOTAL VALUE		29611 mbf			\$7,237,262	
Total Biomass 1000 tons	96	87				
COSTS		(Assumes Harvesting Sawtimber and Biomass in One Operation)				
Add sawtimber skyline cost	124	547	mbf X	\$73 /mbf =	\$96,906	
Additional Cost - Heli	154	1986.6	mbf X	\$250 /mbf	\$496,650	
Additional Cost - Long Skid		1590	mbf X	\$20 /mbf	\$31,800	
		Average Unit Size =	50	acres	\$24 /acre	
		Contract Length =	2	years	(\$24) /acre	
		Months Operation =	5	months	\$0 /acre	
Acres of 6"-9.9" biomass-tractor		0	acres X	(\$245 /acre + \$0 /acre)	\$0	
Acres of 3"-9.9" biomass-tractor		4802	acres X	(\$281 /acre + \$0 /acre)	\$1,349,362	
Acres of 6"-9.9" biomass-skyline		0	acres X	(\$1,000 /acre + \$0 /acre)	\$0	
Acres of 3"-9.9" biomass-skyline		30	acres X	(\$2,000 /acre + \$0 /acre)	\$60,000	
		4832	Biomass Acres			
# of sawtimber loads		29611	mbf /	4	mbf/truck	7403
Additional Haul Cost (4 hr avg)		0	hours/trip X	\$50 /hour X	7403	trips
# of biomass loads	###	acres X	18.1	tons/acr	25	tons/tru
Haul Cost Biomass		4	hours/trip X	\$50 /hour X	3498	trips
Surface Replacement-sawtimber		29611	mbf X	\$2.00 /mbf =	\$59,222	
Surface Replacement-biomass		4832	acres X	18.1	tons/acre X	0.33
Subsoiling Costs		400	acres X	\$230 /acre	\$92,000	
BD Costs		29611	mbf X	\$2.00 /mbf	\$59,222	
Road Construction-New		3.0	miles X	35,000 /mile	\$105,000	
Road Construction-Recon		107.1	miles X	7,500 /mile	\$803,250	
Temporary Road Construction		6.2	miles X	5,000 /mile	\$31,000	
Advertised Rate-sawtimber		29611	mbf X	\$37.21 /mbf	\$1,101,806	
Advertised Rate-biomass		4832	acres X	18.1	tons/acre X	\$0.20 /ton
Yield Tax		\$7,237,262	X	2.9%	\$209,881	
Scaling Sawtimber		7403	trips	\$17 /trip	\$125,851	
Scaling Biomass		3498	trips	\$3 /trip	\$10,494	
TOTAL COST					\$5,378,688	
NET VALUE					\$1,858,574	
				PERCENT ABOVE VALUE	26%	
Groups:			Acres/job		Full Time Jobs	
Reforestation Costs	1080	acres X	\$775 /acre	110	22	\$837,000
Grapple Pile	250	acres X	\$820 /acre	120	5	\$205,000
Hand line and Underburn	100	acres X	\$450 /acre	400	1	\$45,000
					\$1,087,000	
DFPZ:						
Grapple Pile	300	acres X	\$250 /acre	120	6	\$75,000
Hand Pile and Burn	50	acres X	\$500 /acre	120	1	\$25,000
Hand line and Underburn	1000	acres X	\$150 /acre	400	6	\$150,000
Mastication	500	acres X	\$400 /acre	120	9	\$200,000
Road Decommissioning	12	miles X	\$5000 /mile	40	1	\$60,000
EA/Prep					\$750,000	
TOTAL NON-HARVEST COST					-\$1,260,000	
Reduced Fire Suppression Cost					\$1,500,000	
TOTAL PROJECT VALUE					\$2,098,574	
Harvest/Biomass				392		
TOTAL FULL TIME JOBS					441	
TOTAL EMPLOYEE-RELATED INCOME					\$18,954,852	
Assumptions:						
* Harvest Value Schedules, CA State Board of Equalization, Table 4, Area 7, Tractor, 23"-29.9" dbh						
** Harvest Value Schedules, CA State Board of Equalization, Misc. Harvest Values, Small Sawlogs, 14"-22.9" dbh						
*** Timber Values for 10"-13.9" are \$25.00/mbf						
Deduction if average volume per acre under 5mbf/ac -\$25, under 2mbf/ac -\$50						
Skyline Yarding \$30/mbf for 23"-29.9"(25% of Volume) \$80/mbf for 14"-22.9"(75% of Volume)						
Cost/ac for unit size increases 0% for 400 ac to 20% for 5 ac						
Cost/ac for contract length decreases 10% every year after one year						
Cost/ac for months of operation decreases 10% for 10 months or more and increases 10% for 4 months or less						
Based on historical relationships between employment and harvest in California during the 1980's, each million board feet harvested supports 6.5 year-around jobs (1 in logging, 4 in sawmill, and 1.5 in US Forest Service employment). In regional economic models of employment for California and the Pacific Northwest, and estimate of one indirect or induced job for every direct timber job is added. Indirect jobs result from the employment created by the local purchase of materials for the sawmill, local expenditures by workers, and the demand for local government employees. Each million board feet harvested supports a total of 13 jobs that are timber related. The restoration and fuel work would support additional direct and indirect employment. There are approximately 14 indirect jobs for every full time field job. All jobs are equivalent to year-around employment						

ECONOMIC ANALYSIS					07/29/06
Empire Alternative " F "					
VALUE - Groups			Total Acres =	3314 acres	
			Total Acres =	0	Low mbf,\$0
PP 23"-29.9" sawtimber *	4%	0 mbf X	(\$ 400 /mbf +	\$0 /mbf)	\$0
SP 23"-29.9" sawtimber *	7%	0 mbf X	(\$ 400 /mbf +	\$0 /mbf)	\$0
WF 23"-29.9" sawtimber *	17%	0 mbf X	(\$ 200 /mbf +	\$0 /mbf)	\$0
DF 23"-29.9" sawtimber *	5%	0 mbf X	(\$ 410 /mbf +	\$0 /mbf)	\$0
IC 23"-29.9" sawtimber *	2%	0 mbf X	(\$ 460 /mbf +	\$0 /mbf)	\$0
ALL 10"-22.9" sawtimber **	65%	0 mbf X	(\$ 130 /mbf +	\$0 /mbf)	\$0
Biomass Value when Removed			0 acres X	18.1 tons/acre X \$11.50 /ton =	\$0
VALUE - DFPZ			Total Acres =	3314	Low mbf,(\$25)
			Actural PA		
PP 23"-29.9" sawtimber *	0%	0 mbf X	(\$ 400 /mbf +	(\$25) /mbf)	\$0
SP 23"-29.9" sawtimber *	0%	0 mbf X	(\$ 400 /mbf +	(\$25) /mbf)	\$0
WF 23"-29.9" sawtimber *	0%	0 mbf X	(\$ 200 /mbf +	(\$25) /mbf)	\$0
DF 23"-29.9" sawtimber *	0%	0 mbf X	(\$ 410 /mbf +	(\$25) /mbf)	\$0
IC 23"-29.9" sawtimber *	0%	0 mbf X	(\$ 460 /mbf +	(\$25) /mbf)	\$0
ALL 10"-22.9" sawtimber **	100%	1657 mbf X	(\$ 130 /mbf +	(\$25) /mbf)	\$215,410
Biomass Value when Removed			1657 mbf	0.5 mbf/acre	
			3314 acres X	18.1 tons/acre X \$11.50 /ton =	\$689,809
VALUE - ITS			Total Acres =	0 acres	Low mbf,\$0
PP 23"-29.9" sawtimber *	1%	0 mbf X	(\$ 400 /mbf +	\$0 /mbf)	\$0
SP 23"-29.9" sawtimber *	2%	0 mbf X	(\$ 400 /mbf +	\$0 /mbf)	\$0
WF 23"-29.9" sawtimber *	5%	0 mbf X	(\$ 200 /mbf +	\$0 /mbf)	\$0
DF 23"-29.9" sawtimber *	2%	0 mbf X	(\$ 410 /mbf +	\$0 /mbf)	\$0
IC 23"-29.9" sawtimber *	1%	0 mbf X	(\$ 460 /mbf +	\$0 /mbf)	\$0
ALL 10"-22.9" sawtimber **	90%	0 mbf X	(\$ 130 /mbf +	\$0 /mbf)	\$0
Biomass Value when Removed			0 acres X	18.1 tons/acre X \$11.50 /ton =	\$0
TOTAL VALUE					1657 mbf
					\$905,219
Total Biomass 1000 tons	60				
COSTS					### (Assumes Harvesting Sawtimber and Biomass in One Operation)
Add sawtimber skyline cost	###		14 mbf X	\$80 /mbf =	\$96,906
Additional Cost - Heli			0 mbf X	\$250 /mbf	\$0
Additional Cost - Long Skid			0 mbf X	\$20 /mbf	\$0
			Average Unit Size =	50 acres	\$24 /acre
			Contract Length =	2 years	(\$24) /acre
			Months Operation =	5 months	\$0 /acre
Acres of 6"-9.9" biomass-tractor			0 acres X (\$245 /acre +	\$0 /acre)
Acres of 3"-9.9" biomass-tractor	324		acres X (\$281 /acre +	\$0 /acre)
Acres of 6"-9.9" biomass-skyline			0 acres X (\$1,000 /acre +	\$0 /acre)
Acres of 3"-9.9" biomass-skyline	30		acres X (\$2,000 /acre +	\$0 /acre)
			3314 Biomass Acres		
# of sawtimber loads	1657		mbf /		4 mbf/truck 414
Additional Haul Cost (4 hr avg)	0		hours/trip X	\$50 /hour X	414 trips
# of biomass loads	###		acres X	18.1 tons/acre	25 tons/truck 2399
Haul Cost Biomass	4		hours/trip X	\$50 /hour X	2399 trips
Surface Replacement-sawtimber	1657		mbf X		\$2.00 /mbf = \$3,314
Surface Replacement-biomass	3314		acres X	18.1 tons/acre X	0.33 /ton = \$19,994
Subsoiling Costs	400		acres X	\$230 /acre	\$92,000
BD Costs	1657		mbf X	\$2.00 /mbf	\$3,314
Road Construction-New	0.0		miles X	35,000 /mile	\$0
Road Construction-Recon	48.3		miles X	7,500 /mile	\$362,250
Temporary Road Construction	1.9		miles X	5,000 /mile	\$9,500
Advertised Rate-sawtimber	1657		mbf X		\$15.00 /mbf \$24,855
Advertised Rate-biomass	3314		acres X	18.1 tons/acre X	\$0.20 /ton \$11,997
Yield Tax	\$905,219		X	2.9%	\$26,251
Scaling Sawtimber	414		trips	\$17 /trip	\$7,038
Scaling Biomass	2399		trips	\$3 /trip	\$7,197
TOTAL COST					\$2,127,221
NET VALUE					(\$1,222,001)
					PERCENT ABOVE VALUE -135%
Groups:					Acre/jobFull Time Jobs
Reforestation Costs	0		acres X	\$775 /acre	110 0 \$0
Grapple Pile	0		acres X	\$820 /acre	120 0 \$0
Hand line and Underburn	0		acres X	\$450 /acre	400 0 \$0
DFPZ:					
Grapple Pile	300		acres X	\$250 /acre	120 6 \$75,000
Hand Pile and Burn	90		acres X	\$500 /acre	120 2 \$45,000
Hand line and Underburn	410		acres X	\$150 /acre	400 2 \$61,500
Mastication	931		acres X	\$400 /acre	120 17 \$372,400
Road Decommissioning	12		miles X	\$5000 /mile	40 1 \$60,000
EA/Prep					\$750,000
TOTAL NON-HARVEST COST					-\$1,363,900
Reduced Fire Suppression Cost					\$1,500,000
TOTAL PROJECT VALUE					-\$1,085,901
Harvest/Biomass					22
TOTAL FULL TIME JOBS					49
TOTAL EMPLOYEE-RELATED INCOME					\$2,092,996
Assumptions:					
* Harvest Value Schedules, CA State Board of Equalization, Table 4, Area 7, Tractor, 23"-29.9" dbh					
** Harvest Value Schedules, CA State Board of Equalization, Misc. Harvest Values, Small Sawlogs, 14"-22.9" dbh					
*** Timber Values for 10"-13.9" are \$25.00/mbf					
Deduction if average volume per acre under 5mbf/ac -\$25, under 2mbf/ac -\$50					
Skyline Yarding \$30/mbf for 23"-29.9"(25% of Volume) \$80/mbf for 14"-22.9"(75% of Volume)					
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Cost/ac for contract length decreases 10% every year after one year					
Cost/ac for months of operation decreases 10% for 10 months or more and increases 10% for 4 months or less					
based on historical relationships between employment and harvest in California during the 1980's, each million board feet harvested supports 6.5 year-around jobs (1 in logging, 4 in sawmill, and 1.5 in US Forest Service employment). In regional economic models of employment for California and the Pacific Northwest, and estimate of one indirect or induced job for every direct timber job is added. Indirect jobs result from the employment created by the local purchase of materials for the sawmill, local expenditures by workers, and the demand for local government employees. Each million board feet harvested supports a total of 13 jobs that are timber related. The restoration and fuel work would support additional direct and indirect employment. There are approximately 14 indirect jobs for every full time field job. All jobs are equivalent to year-around employment					