

CHAPTER VI

Distribution List

Copies of the Final Environmental Impact Statement (FEIS) and Forest Plan were distributed to all the agencies, organizations and individuals on the Shasta-Trinity NF mailing list. The mailing list has been maintained for over 10 years and was most recently updated to include any agency, organization, or member of the public who submitted comments on the 1993 Draft EIS. The list printed in this chapter is not inclusive. The complete mailing list is on file at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, California. Refer to Appendix K for responses to comments received on the Draft EIS.

Elected Officials

Federal

Congressman Dan Hamburg
 Congressman Wally Herger
 Congressman Vic Fazio
 Senator Barbara Boxer
 Senator Dianne Feinstein

State

Assemblyman Stan Stathem
 Senator K. Maurice Johannessen
 Senator Tim Leslie
 Senator Mike Thompson
 Attorney General Dan Lungren

Federal Agencies

Advisory Council on Historic Preservation
 Delaware River Basins Commissions
 Environmental Protection Agency
 Region IX
 Environmental Review Branch
 Federal Railroad Administration
 Federal Agency Liaison Division
 Federal Energy Regulatory Commission
 Federal Highway Administration
 General Services Administration
 Interstate Commerce Commission
 USDA Aphis ADC

USDA Forest Service
 Director of Environmental Coordination
 Pacific NW Regional Office
 Pacific SW Regional Office
 Land Management Planning
 Pacific SW Experiment Station

Washington Office

Land Management Planning
 Office of Environmental Coordination
 Office of the Chief
 Public Affairs Department
 USDA Office of Equal Opportunity
 USDA office of General Council
 USDA Soil Conservation Service
 USDA Rural Electrification Administration
 USDC Office of General Council
 USDI Bureau of Indian Affairs
 USDI Bureau of Land Management
 USDI Bureau of Reclamation
 USDI fish and Wildlife Service
 USDI National Park Service
 USDT Federal Highway Administration
 US Army Corp of Engineers
 US Coast Guard
 US Department of Commerce
 Habitat Conservation Division
 NOAA Ecology & Conservation Division
 US Department of Defense
 Chief of Naval Operation
 Deputy Assistant Secretary of Defense
 Deputy Assistant Secretary of the Air Force
 US Department of Energy
 US Department of Health and Human Services
 US Department of Housing and Urban Development
 US Department of Labor

State Agencies

Air Resources Board
 California State Board of Forestry
 California Department of Boating and Waterways
 California Department of Fish and Game
 California Department of Forestry and Fire Protection
 California Department of Justice
 California Department of Parks and Recreation
 California Department of Transportation Districts 1 & 2
 California Farm Bureau FB-12
 California Highway Patrol
 California Regional Water Quality Control Board
 Central Valley Region
 North Coast Region
 California Resources Agency
 California State Clearing House
 California State Lands Commission
 California Water Resources Control Board

Local Agencies

Cities

City of Anderson
Crty of Coming
City of Dunsmuir
Crty of Mt Shasta
City of Red Bluff
City of Redding
City of Weed
Crty of Shasta Lake

Counties

Humboldt
Board of Supervisors
Modoc
Administrative Officer
Board of Supervisors
Shasta
Board of Supervisors
Planning Commission
Planning Director
Public Works Director
Superintendent of Schools
Siskiyou
Board of Supervisors
Farm Bureau
Planning Commission
Planning Director
Public Works Director
Superintendent of Schools
Tehama
Board of Supervisors
Planning Commission
Planning Director
Public Works Director
Superintendent of Schools
Tnnrty
Board of Supervisors
Planning Commission
Planning Director
Public Works Director
Resource Distnct
Superintendent of Schools
Transportation Planning

libraries

Chico State University
College of the Siskiyous
Colorado State University
Dunsmuir Branch Library
Humboldt State University
Klamath-Trinity Library

Shasta College
Shasta County (main branch)
Shasta County (Anderson)
Shasta County (Burney)
Siskiyou County
Tehama County (Red Bluff)
Trinrty County (Hayfork)
Tnnrty County (Trinity Center)
Trinty County (Weaverville)
University of California (Berkeley)

Educational

Chico State University
College of the Siskiyous
Hayfork High School
Humboldt State University
John Muir Institute
Mt Shasta High School
Shasta College
University of California at Berkeley
University of Pennsylvania
University of Southern Alabama
University of Wyoming

Interest Groups

American Motorcycle Association
American Fisheries Society
American Forest & Paper Association
Audubon Society
Los Angeles
Mt Diablo
Mt Shasta
Napa-Solano
Backcountry Horsemen of California
Bollibokka Land Company
California Association of 4WD Clubs
California OHV Association
California Trout
California Forestry Association
California Wilderness Coalition
California Native Plant Society
California Coalition for Alternatives to Pesticides
Caribbean Sea Turtle Conservation Network
Citizen's Commrtee to Save Our Public Lands
Citizens for Better Forestry

Citizens Groups

Coalition for Health of California Fishenes
California Off Road Vehicle Association, Inc
Far West Motorcycle Club
Federation of Fly Fishers

Friends of Chinquapin
 Friends of the River
 Graduates for Old-Growth
 Hayfork Mining District
 Klamath Alliance for Resources & Environment
 Klamath Forest Alliance
 McCloud River Preserve
 McCloud River CRMP
 Mendocino Environmental Center
 Minerals Exploration Coalition
 Mt Shasta Snowmobile Club
 Mt Shasta Tomorrow
 National Resources Defense Council
 National Speleological Society, Diablo Grotto
 Nor-Cal Broncos
 Northern California AFSEEE
 Northcoast Environmental Center
 Off-Highway Motor Vehicle Rec
 California Water Resources Control Board
 Pacific Coast Federation of Fishermen's Associations
 Preservation Conference Inc
 Safe Alternative for our Forest Environment
 Save Mt Shasta
 Shasta Alliance for Resources & Environment
 Shasta Lake Boaters Association
 Shasta Miners & Prospectors
 Shasta-Trinity Bioregional Council
 Sierra Club
 Mother Lode Chapter
 Redwood Chapter
 San Francisco Bay Chapter
 Santa Lucia Chapter
 Sierra Club Legal Defense Fund Inc
 Ski Mt Shasta

Southern California Ancient Forest Advocates
 South Fork Mtn Defense Committee
 South Fork Trinity Up-River Friends
 Tehama Alliance
 The American Alpine Club
 The Fund For Animals
 United 4-Wheel Association
 Unitarian Universalist Church
 Wilderness Society

Businesses

Bar 717 Ranch Inc
 Burney Forest Products
 Cascade World
 Cedar Gulch Ranch
 Environmental Consulting, Planning Design
 Evans Environmental Consultants
 Hearst Corporation
 High Ridge Lumber Co
 Insurance Journal

Interdisciplinary Researches
 Laughing Heart Adventures
 Lost coast 4X4's
 Mt Shasta Herald
 PG&E
 Pacific Therapy Center
 Pacific Wood Fuels Co.
 Pacificorp
 Polar Equipment Co
 Redding Oil Co
 Roseburg Forest Products
 Ross Recreation Equipment
 Running Wild
 The Gold Rush
 Wildland Fire Educational Services
 WRC Environmental
 Yolo Environmental Resources Center

American Indian Tribes And Nations

Big Bend Rancheria
 Burnt Ranch Indian Assn
 California Council of Tribal Governments
 Local Indians for Education
 Montgomery Creek Rancheria
 Northern California Indian Development Council
 Pit River Tribal Council
 Pit River & Karuk Tribes of Northern California
 Roaring Creek Rancheria
 Shasta Nation, The
 Winmen Wintu Camp Organization
 Wintu Education and Cultural Council
 Tsungwe Council & Elders
 Yurok Indian Tribe

Individuals

Adams, Edward
 Aldinger, Sally
 Alexander, John & Debra
 Allen, Bob
 Allan, Michael & Linda
 Allison, Dave
 American Forest & Paper
 Anderson, Ken
 Anderson, Richard
 Aramayo, Robert
 Arcieri, Virginia
 Arden, Alma
 Armstrong, Cheryl
 Auerbach, Elise

Baer, Lynn & Connie
 Bailey, Mark & Melinda
 Baker, Carol
 Balcom, Mark & Jan

Chapter VI - Distribution List

Baldwin, Herb
Baldwin, Kenneth
Ballew, Lany
Baltic, Tony
Barnette, Karen L
Barbour, Sandra
Barron, Frank
Bartlett, Donald
Bartson, Andy
Battaglia, Phillip
Baumgartner, William
Baxter, David
Beamer, Lesa
Beatty, Kenneth
Belli, Vince J
Benjamin, Nathan
Berdtshchevsky, M
Berg, Bill
Bernhart, Ursula A
Biery, Ed
Bish, David
Blackburn, Wanda
Blackstone, Mary
Bloom, Richard
Blomstrom, Greg
Blum, Frank B, Jr
Blumberg, Lewis
Bolton, June
Boone, Sandra
Borba, Carl
Borg, Lennea
Bottini, Franchesca
Boyd, Mimi
Bower, Joseph & Susan
Bowker, Lee - Dean
Bradfield
Bradford, Carlton & Joy
Bralver, Peter
Branch, Thomas & Pamela
Brannon, Melissa
Brennen, Jude
Broshears, James
Brown, Charlie
Browning, Dennis A
Buckley, John
Bucknavage, Jasmine
Bunnell, Lee
Burdette, Emily
Burke, Christopher H
Busby, Frank
Byron, Lewis

Cain, Tim
Calomiris, John, PE
Camp, Larry

Cantore, Dons
Capo, Phillip
Carlson, Bertha
Carnemolla, Anthony M
Casasjian, Carol
Cascade Cove Resort
Cassidy, Tom
Cedar Stock Resort
Chapman, Robin
Chamber of Commerce, Redding
Chamber of Commerce, Anderson
Chamber of Commerce, McCloud
Champion Timberlands
Chatham, R A
Christoph, Marguerite
Christopher, Richard
Cimino, Richard
Clemens, Jeffrey
Cline, Obie Jean
Coe, David
Coenen, Tim
Coffman, Ernie
Cole, Marianne
Coleman, Charles
Colson, Chris
Comartin, Andrea
Combes, Harold H
Conway, Bill
Cook, Walter
Cooksley, Jack
Cooper, Paul
Cooperrider, Allen
Corp, Dennis
Coules, Dennis
Cowardin, R M
Cox Family
Cramsey, David
Cross, Diane L
Curry, Charles

Danel, Russell
Danks, Cecilia
Daniels, James
David, Lawler
De Jager, William R
Dederian, Rich
Degmetich, Charles
De Jong, Aart C & Margaret Mitchell
Delaney, Bill
Depree James W
Dern, Carolyn
Dickins, Jennifer
Dodson, Jake
Dominquez, Mannie
Douglas, Claude

Downer, Craig C.
 Dufort, Robert
 Duncan & Associates
 Dunnaez, Garnet
 Echlin, Edward
 Economou, Constantina
 Edwards, Jeffrey
 Edwards-Sayer, Peter
 Eisenberger, Arthur & Roma
 Eissler, Fred
 Elgin, Russell
 Elsea, Rollie
 Ely, George
 Emmons, Staci
 Eng, Helge
 Englebrecht, Mary Elizabeth
 Engstrom, Tom
 Erosion Control Inc
 Evans, Steve
 Evans, Willis A
 Everett, Yvonne

Farrar, Wm R Jr.
 Felts, Alexis
 Ferrara, Robert
 Ferris, Howard
 Fischer, Meade
 Fitzwater, Michael
 Flanigan, Celeste Kay
 Floeter, Conrad
 Floyd, Lora
 Floyd, Phillip
 Ford, David Ralph
 Francheski, Shawna
 Franklin, Robert
 Frase, Dave
 Freeman, Dennis
 French, William
 Fries, John
 Fritz, John
 Frost, Martha
 Funocchi, Mart Ann

Garrett, Lawrence
 Gaylor, Henry III
 Geddie, John
 Gerstley, Mrs James
 Gerstung, Eric
 Gillless, Kerth
 Gilmer, Don
 Gitlin-Emmer, Susan
 Glick, Ron
 Gluck, David
 Goldi, Virginia
 Gomez, Terry

Goodrich, Lucile
 Goodrich, Roberta
 Graham, Dr & Mrs John
 Gramrosa, Neil A
 Graves, Edward
 Green, Randy
 Grosser, Paul
 Guildman, Thomas
 Gunn, Lynn

Haas, Michael
 Hallenbeck, Bea
 Hamilton, E
 Hammons, Mananne Handler, Leslie
 Hansell, Margaret
 Hansen, Doug
 Hanson, Norma
 Harkin, Don
 Harms, Bobbie
 Haroun, Lee
 Hamngton, Ann & Larry
 Harris, Manlyn
 Harris, Ronald
 Hart, John
 Harter, Jane
 Harvey, Alison
 Head, Dale
 Hecter, Susan
 Hembling, Bnan
 Henell, Elizabeth
 Henn, Winfield
 Hercsuth, Emil Albert
 Hesseldenz, Tom
 Higbie, Wesley
 High Ridge Lumber Company
 Hills, Leighton
 Hinman, Bill
 Hodgehead, David
 Hoekstra, Bud & Maurie
 Holdon, Matthew
 Hollister, Aletta
 Holquist, Robert C
 Holzer, Tim
 Honemann, Patricia
 Holquist, Robert C
 Hopkins, Karen
 Horowitz, Richard
 Horton, Barbara & Melvin
 Howard, Roni
 Howard & Rullman, Marge & TA
 Hrubes, Robert
 Hull, Eugenia
 Hunt, Buel B
 Hurlbut, Dr Stephen

Chapter VI - Distribution List

Ibison, Jodie
Ingram, Paul

Jackson, Michael
Jacobowitz, Ira
James, Karen
Janosik, Steve
Janson, Delmar
Jedkins, Jeremy
Jensen, Gregory P
Johns, William
Johnson, Alec
Johnson, Darrow
Johnson, David E
Jones, Jennifer
Jungwith, Lynn

Kapple, Kathi
Katzen, Joanne
Kemp, Mrs Richard
Kimball, Don
Kinyon, Carey G
Kitt, Jeffrey
Klemenchch, Jack
Kloefkorn, Walter
Koths, Kristen
Kottinger, Jim
Kramer, Kenneth
Krol, Robert
Krueger, David S
KSYC
Kusek, Joan

Lacey, Henry B
Lacy, Robin
Lackey, Dale
La Pre, Lawrence F
Lake, Larry
Landeiro, Clara
Lanng, Evelyn & Nils
Larkin, Sean
Lasko, Carol
LaVarete, John
LaZier, Cathie
Leimert, Walter
Light, Lillian
Lilink, Lynda
Lincke, Susan
Logan, Barbara
Lorentzen, Bob
Lowell, Larry

Mackay, Steve
Maertz, Bernice C
Maggiora, Maureen
Malkin, Deborah

Mannion, Denise
Marks, Martha A
Marr, Tom
Marskell, Greg
Martin, Carl
Martin, Donald
Martin, Dan
Martin, Frances
Mason, Peter
Mason, Tad
McAllister, Bard
McCall, Linds, Sherrod, S Cameron & Megan
McCann, Catherine
McDowell, Richard
McKinley, Mary Anna
McKinney, Lisa
McKinney, Marilyn
McLaughland, Robert
McMahon, Marion & John
McMaster, Ken
McNicholas, Thomas & Stephanie
McOlin, Beacon L
Mecchi, Donald E
Meier, Alan
Meigs, Theodore & Ruth
Melo, Louis
Messenger, Lee
Metzger, Harry
Meyer, Bill & Dianne
Middleton, Jim
Miles, Matthew
Miller, Carla
Miller, Charles esq
Miller, Sally
Miller, Ronald W
Millers-Younger, Sandra
Mitchel, Juanita
Mitchel, Marie
Miyoshi, Mark
Modine, Ralph
Moore, Claudia
Moore, Don
Moore, Patrick
Morel, Barbara
Moretti, Julie
Moms, Don
Moms, Gloria
Moses, Robert E
Mountjoy, Daniel
Mueller, Emil J
Mueller, Mrs P
Munroe, Dean
Murphy, Edward C

NACLO
 Nardi, Michael
 Nelson, Irí
 Nelson, Dennis
 Nelson, Echo
 Newbold, P
 Newby, Theresa
 Newby, Michael
 Newton, Phil
 Niswauder, Ruth
 Nowacki, Anne & Doug

 O'Reilly, Matthew
 Olley, John
 Olsen, Bruce
 Orre, Ed
 Owens, Jim

 Pace, Felice
 Pacific Gas & Electric
 Page, Jim
 Painter, Robert
 Palmer, Neil
 Papini, B
 Pardy, Linda Louise
 Parton, Glen
 Parton, Lona
 Patterson, Nellie
 Peckham, Kathleen
 Peckham & Leonard, KE&KM
 Pella-Donnelly, Mary Anne
 Perlstein, Joel
 Perske, Douglass
 Peterson, Elizabeth
 Peterson, Howard
 Prtton, Helen
 Pomeroy, Elizabeth
 Ponting, Gordon
 Power Engineers
 Pulliam, Dorothy & Hershel S

 Quilaca, Phil
 Quinlan, Erin

 Rafacz, Bernard
 Raleigh, Dr D
 Ramp, Rudy
 Rapf, Marni & John
 Rathman, Pat
 Ravizza, Thomas J
 Reagan, Kelly
 Rechin, Julie
 Reinhart, Robin
 Refkin, Mike
 Reiser, Bruce
 Renouf, Rich
 Ribera, Manco

 Riccomini, George
 Richard, Christopher
 Richards, Ed
 Richardson, Aaron & Ione
 Riesso, Jessica
 Riggs, Katherine
 Rippi, George
 Rival, William
 Rivera, Joe Jr
 Robbins, Peter
 Robley, Katie
 Rocky, J
 Rogalin, Kim
 Rogers, Ron
 Rogers, I
 Rogers, Eric
 Roper, Deborah
 Rosa, Nicholas
 Rose, David
 Rose, Menko
 Roser, Kurt B
 Roseburg Resources Co
 Roth, Barry Ph D
 Rothenberg, Rebecca
 Rourke, Mike
 Rowland, Greg

 Sanders, Dee W
 Sanders, Charles
 Sanderson, Terry & Winke
 Santa Cruz, Andrew
 Santa Cruz, Susan
 Sattler, Ronald J
 Sauffley, Frost
 Sawyer, John
 Sawyers, James
 Scales, Todd & Anna
 Scenic Resource Management
 Schaeffer, Mark
 Scheck, Dennis, Stephanie, Diana, Stephen
 Scheidegger, Kirk
 Schimps, Erich F
 Schiraga, Lori
 Schlosser, John
 Schmidt, Fred C
 Scholbe, Arthur
 Scholfield, Michelle
 Schroeder, Arthur
 Schubin, Tom
 Schwartzberg, Carl
 Scott, Sally
 Scratch, Verna
 Self, Steven
 Sertovich, Barbara
 Sharpenter, Robert
 Shaw, Robert H

Chapter VI - Distribution List

Shirk, Onalee
Sickal, Kenneth
Sierra Pacific Industries
Silver, Dan
Simmen, Eric
Sims, Don
Slater, Jerry
Smegal, Tom
Smekar, Frank
Smith, Kenneth
Smith, Megan
Smith, Michael
Smith, Mike
Smith, Susan
Sochet, Marty
Soderlund, A
Speake, Constance
Steffenson, Frank
Steffenson, John
Steffenson, Mary Lee
Steger, Eric D
Steinberg, Dr & Mrs Daniel
Steger, Eric D
Stokes, Jim
Storey, Dr Keith
Storm, Donald
Strachan, A
Strand, Bonnie
Streamfellow, Dwight
Stymus, John
Suk, Tomas
Sundstedt, David
Swanson, John

Taff, Mike
Taylor, Nancy
Thomas, Leonard
Thomas Lynn R
Todd, Joyce
Toler, Irvin E
Towle, Phil
Trinity Journal
Tromba, Sal & Family
Truman, Patrick
Tuan, Linda
Tuck, Gene
Tupin, Mr & Mrs Joe
Tustin, Wayne & Shirley

Ulrich, Larry & Donna

Van Epps, Charles P
Van Steenberg, Mary

Vanness, Richard
Vanoli, Mike, Merril, Wayne

Vinyard, Lucille
Volker, Steven
Von Hein, Robert
Voss, Michael
Vulcan Power Company

Wagner, Steve
Wale, Tom
Walker, Paula Jean
Walsh, S J MD
Wasieleweski, Jeff
Webb, David
Weidenkeller, Roland
Weidert, Carl & Stanley
Weidlich, Mary Lou
Wells, Mark
Welsch, William
Weseloh, Tom
Western Timber Service
Weston, Scott
Wetherby, Barret H
Wheeler, Wilma & Bryce
Wheatley, Mark
Whitaker, H
Whitehouse, George
Willard, Dwight
Williams, Mike
Willason, William
Willison, Darla
Willison, John
Wilson, Karen
Wilson, Harry E
Wilson, James
Windus, Walter
Witteman, Richard
Wolfe, Joni
Wolff, Jim
Wolochow, Dr Donald
Wong, Tammy
Woody, C
WRC Environmental
Wright, Graham }
Wu, Rebecca
Wysocki, Cheryl

Yanck, Burnell E
Youngblood, Dick
Yoshioka, Glenn

Chapter VII

Bibliography

CHAPTER VII

Bibliography

- Alexander, Earl B "Relative Chance for Survival of Planted Conifer Seedlings Based on Physical Site Factors in California" U S Department of Agriculture (USDA), Forest Service, Unpublished Forest Service Report, 1981
- Airola, DA "Guide to the California Wildlife Habitat Relationship System" California Department of Fish and Game 1988
- Bacon, Mary E "Redband Trout, Shasta-Trinity National Forests, California, Comprehensive Habitat Management Plan" USDA, Forest Service, Pacific Southwest Region, Redding, CA, March 1980
- Benson, Patrick C "Land Use and Wildlife with Emphasis on Raptors" 1979
- Biosystems Analysis, Inc "Pit 3, 4, and 5 Project Bald Eagle and Fish Study (Final Report)" University of California, Davis, April 1985
- Brobst, Donald A and Walden P Pratt, editors "United States Mineral Resources Survey Professional Paper 820" U S Department of Interior, Geological Survey, U S Government Printing Office, Washington, D C , 1973
- Bull, Evelyn Louise "Habitat Utilization of the Pileated Woodpecker, Blue Mountains, Oregon" Masters Thesis, Oregon State University, Corvallis. OR, 1975
- Bureau of the Census "PHC 80-v-6" March 1981
- California State of, Air Resources Board "California Air Pollution Control Laws" 1981
- California, State of, Department of Finance, "Report 83P-1 and 83E-2" September 1983 and February 1984, respectively
- California, State of, Department of Fish and Game, "Status and Management of Spring-run Chinook Salmon" May 1990
- California, State of, Department of Parks and Recreation "California Outdoor Recreation Resources Plan" Sacramento, CA, 1974
- California, State of, Department of Parks and Recreation "California State Park System Plan" 1980
- California, State of, Department of Parks and Recreation "Recreation Outlook in Planning, District 2" 1980
- California, State of, Employment Development Department "Labor Force, Employment, and Unemployment and Wage and Salary Employment, by Industry" 1984
- California, State of, Employment Development Department "Annual Reports for Counties and State" 1987
- California, State of, The Resources Agency "Fish and Wildlife Resources of the Klamath Basin, Lava Beds, and Medicine Lake Highlands Planning Unit and Recommendations for their Protection" Department of Fish and Game (DFG), Redding, CA, 1976
- California Statistical Abstract, 1970
- Call, Mayo W "Nesting Habitats and Surveying Techniques for Common Western Raptor" U S Department of Interior, Bureau of Land Management (BLM), Technical Note TN-316, 1978
- Coats, Robert N , and TO. Miller "Cumulative Silvicultural Impacts on Watersheds A Hydrologic and Regulatory Dilemma" Environmental Management, 5(2) 147-160, 1981
- Coats, R N , T O Miller, and DW Kallstrom "Assessing Cumulative Effects of Silvicultural Activities". John Muir Institute, Napa, CA, 1979
- Daniel, Theodore W , John A Helms, and Frederick S Baker "Principles of Silviculture" Second Edition McGraw-Hill
- Deeming, John, Robert E Burgan, and Jack D Cohen "The National Fire-Danger Rating System - 1978" General Technical Report IMT-39 USDA, Forest Ser-

Chapter VII - Bibliography

- vice. Intermountain Forest and Range Experiment Station, Ogden, UT, 1977
- DeGraaf, R M , V E Scott, R H Hamre, L. Ernst, and S H Anderson "Forest and Rangeland Birds of the United States Natural History and Habitat Use" USDA Handbook 688 1991
- Dunning, Duncan, and L H Reineke "Preliminary Yield Tables for Second Growth Stands in the California Pine Region" Technical Bulletin No 354 USDA, Forest Service, Pacific Southwest Forest and Range Experiment Station, Washington, D C , 1933
- Ellis, Susan R "Five Year Status Report - Rough Sculpin" State of California, DFG, Sacramento, CA, May 1988
- Forsman, Eric D "A Preliminary Investigation of the Spotted Owl in Oregon" Unpublished Masters Thesis, 1975
- Forsman, Eric D , et al "Spotted Owl Abundance in Young versus Old-growth Forests, Oregon" Wildlife Society Bulletin 5 43-47, 1977
- Forsman, Eric D "Accipiter Management of the Fremont National Forest" 1979
- Forsman, Eric D "Habitat Utilization by Spotted Owls in the East Central Cascades of Oregon" Unpublished Doctorial Dissertation. 1980
- Fuller, Mark R , and James A Mosher "Methods of Detecting and Counting Raptors A Review from A Symposium on Estimating the Numbers of Terrestrial Birds" Asilomar, CA, 1980
- Gordon, Donald T "Even-aged versus Uneven-aged Management in Eastside Pine" In Management of the Eastside Pine Type in Northeastern California - Proceedings of A Symposium, June 1982, Lassen College Forest Resource Center, Susanville, CA, (Thomas F Robson and Richard B Standiford. eds) Northern CA Society of American Foresters. saf 83-06, pp 54-58. 1983
- Gottshall, Glen, Allen Boss, Harry Hopkins, and Charles Price "Guidelines for Timber and Wildlife Management Coordination in Regeneration Cutting for Eldorado National Forest" USDA, Forest Service. Pacific Southwest Region, Eldorado National Forest, Placerville, CA, 1979
- Gould, Gordon I , Jr "The Status of the Spotted Owl in California" California, State of, The Resources Agency, DFG, Sacramento, CA, and USDA, Forest Service, Pacific Southwest Region San Francisco, CA, 1974
- Hall, J Alfred "Forest Fuels, Prescribed Fire, and Air Quality" USDA, Forest Service, Pacific Forest and Range Experimental Station, 1972
- Harr, Dennis R , R L Fredrikson, and J Rothacher "Changes in Streamflow Following Timber Harvest in Southwestern Oregon" USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, Research Paper PNW-249, Portland, OR, 1979
- Harris, S W , L Harris, and B G Marcot "California Wildlife Habitat Relationships Program, North Coast/Cascades Zone" (USDA), Forest Service Report, Vol II Bird Narratives 1979
- Haskins, D M "A Management Model for Evaluating Cumulative Watershed Effects" Proceedings from the California Watershed Management Conference, November 1986, West Sacramento, CA, pp 125-130, 1986
- Haynes, kchard W , Kent P Connaughton, and Darius M Adams "Stumpage Price Projections for Selected Western Species" USDA, Forest Service, Research Note PNW-367. November 1980
- Helms, John A "The California Region In Regional Silviculture of the United States" Second Edttion (John W Barrett, ed) John Wiley & sons, pp 391-446, 1980
- Hiserote, Bruce A , and James O Howard "California's Forest Industry" USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1978
- Houck, J W and B G Marcot "California Wildlife Habttat Relationships Program, North Coast/Cascades Zone" (USDA) Forest Service Report, Vol I Herp Narratives 1979
- Houck, J W , S W Harris, L Harris, A Mossman, and B G Marcot "California Wildlife Habitat Relationships Program, North Coast/Cascades Zone" (USDA) Forest Service Report, Vol IV, Species/Habitat Matrix 1979
- Howard, James O "California's Forest Product Industry 1982" USDA, Forest Service, Pacific Northwest Forest and Range Experiment Station, 1984

- Johnson, Donald R "The Study of Raptor Populations" University Press of Idaho, Moscow, ID, 1978
- Johnson, K Norman, Brad Gilbert, and Sarah Crim "FORPLAN Version II User's Guide" USDA, Forest Service, June 1986, revised
- Lehman, Robert N "A Survey of Selected Habitat Features of 95 Bald Eagle Nest Sites in California" Administrative Report No 79-1 California, State of, the Resources Agency, DFG, Wildlife Management Branch, Sacramento, CA, 1979
- MacCleery, Douglas W "Logging on South Fork Mountain A Look at Past Activities and Implications for Future Management of the Area" Unpublished Internal Memorandum USDA, Forest Service, Pacific Southwest Region, Shasta-Trinity National Forests, Hayfork Ranger District, CA, 1974
- Malette, Robert D and Ronald W Schlorft "A Plan for California Raptor" 1978
- Manuwal, David A, and Garet Munger "The Effect of Timber Harvest on Bird Populations in the Douglas-fir Forests of Washington State" Final Report to USDA, Forest Service, Pacific Northwest Region, Portland, OR, 1978
- Marcot, Bruce G "California Wildlife Habitat Relationships Program North Coast Cascades Zone 5" USDA, Forest Service, Pacific Southwest Region, 1979
- Marcot, Bruce G "Prolegomena of the Spotted Owl, *Strix occidentalis* (In Six Rivers National Forest)" Technical Report, Six Rivers National Forest, Eureka, CA, 1978
- Marcot, Bruce G, and Jeffrey Gardetto "Status of the Spotted Owls in Six Rivers National Forest" USDA, Forest Service, Pacific Southwest Region, Six Rivers National Forest, Eureka, CA, 1980
- Marcot, B G "California Wildlife Habitat Relationships Program, North Coast/Cascades Zone" (USDA), Forest Service Report, Introduction Vol 1979
- Martin, Ilse, David Hodder, and Clark Whitaker "Overview of the Cultural Historic Resources of Euro-American and other Immigrant Groups in the Shasta-Trinity National Forests" Contract No 53-9A28-9-2974
- Mayer, K.E. and WF Laudenslayer, Jr. "A Guide to Wildlife Habitats of California" California Department of Forestry and Fire Protection 1988
- Meyer, Walter H "Yield of Even-aged Stands of Ponderosa Pine" Pacific Northwest Technical Bulletin No 630, USDA, Washington, D C, 1938
- Mossman, A and B G Marcot "California Wildlife Habitat Relationships Program, North Coast/Cascades Zone" (USDA) Forest Service Report Vol III, Mammal Narratives 1979
- Moyle, Peter B "Inland Fishes of California". University of California Press, Berkeley and Los Angeles. CA, 1976
- Moyle, Peter B and Michael D Morford "Salmon, Steelhead, Smelt, and Sturgeon in California Endangered Resources". January 1991
- Olendorff, kchard R, Robert S Motroni and Mayo W Call "Raptor Management - The State of the Art" Technical Note No 345, US Department of Interior, BLM, 1980
- Oregon Interagency Spotted Owl Management Plan
- Oregon - Washington Interagency Wildlife Committee Riparian Habitat Subcommittee "Managing Riparian Ecosystems (Zones) for Fish and Wildlife in Eastern Oregon and Eastern Washington" 1979
- Patton, David R "A Diversity Index for Quantifying Habitat Edge" *Wildlife Society Bulletin* 3(4) 171-173, 1975
- Powers, Robert F, and Charles P Weatherspoon "Analysis of Soil and Site Properties in Paired Clearcut and Uncut Douglas-fir Stands on the Galice Formation, Fox Planning Unit, Six Rivers National Forest" USDA, Forest Service, Pacific Southwest Forest and Range Experiment Station, Redding, CA, January 1984
- Reeves, Gordon H and Terry D Roelofs "Rehabilitating and Enhancing Stream Habitat Field Applications" USDA Forest Service General Technical Report PNW-140 June 1982
- Reynolds, Richard T "Distribution of Nest Sites. Patterns of Use and Site Requirements of Accipiter in Western Conifer Forests" 1979

Chapter VII - Bibliography

- Rice, Raymond M , R B Tilley, and PA Datzman "A Watershed's Response to Logging Roads South Fork CasperCreek, California. 1967-1976" Research Paper PSW-146. USDA, Forest Service. Pacific Southwest Forest and Range Experiment Station, Berkeley, CA, 1979
- Rode, Michael "Bull Trout, Salvelinus confluentus Suckley. in the McCloud River, Status and Recovery Recommendations (Drafty State of California, DFG, Region I, Redding, CA, June 1988
- Ruderman, Florence K , and Debra Warren "Production. Prices, Employment and Trade in Northwest Forest Industries", USDA, Forest Service. Pacific Northwest Forest and Range Experiment Station, quarterly
- Ruediger, Bill "Guidelines for Coordinating Timber Sales with Big Game Winter Range" USDA, Forest Service. Northern Region, Missoula, MT, 1977
- Schemnitz, Sanford D , (ed) "Wildlife Management Techniques Manual" Fourth Edition The Wildlife Society, Washington. D C , 1980
- Schumacher, Francis X "Yield, Stand and Volume Table for Red fir in California" University of California. Berkeley Bulletin 456, Berkeley, CA, 1928
- Schumacher, Francis X "Yield, Stand and Volume Tables for Douglas-fir in California" University of California, Berkeley Bulletin 491, Berkeley, CA, 1930
- Schwarz, Charles F, Edward C Thor, and Gary H Elsner "Wildland Planning Glossary" General Technical Report PSW-13 USDA. Forest Service, Pacific Southwest Forest and Range Experiment Station, 1976
- Scott, David R M "The Pacific Northwest Region In Regional Silviculture of the United States" Second Edition (John W Barrett ed) John Wiley & Sons, pp 447-493, 1980
- Seidelman, P J "Methodology for Evaluating Cumulative Watershed Impacts" USDA, Forest Service, Pacific Southwest Region. Watershed Management, 1980
- Shaw, Samuel P "Wildlife and Oak Management"
- Skinner, Carl "Estimated Annual Available Biomass for 5 Planning Decades of the Forest Land Management Plan" USDA, Forest Service, Shasta-Trinity National Forests, Redding, CA, 1985
- Smith, David M "The Practice of Silviculture" Seventh Edition John Wiley & Sons, 1962
- Society of American Foresters "Choices in Silviculture for American Forests" Society of American Foresteren, Washington. D C , 1981
- Theodoratus. D , et al "Cultural Resource Overview - Archaeology and Native American Resources" Contract No 53-9A28-9-2957, USDA. Forest Service. Shasta-Trinity National Forests, 1981
- Theodoratus. D , et al "Native American Overview - Issues and Concerns Relating to Public Law 95-341" Contract No 53-9,428-0-3130, USDA, Forest Service, Shasta-Trinity National Forests, 1984
- Timossi. I Microcomputer Database System for Wildlife Habitat Relationships Software 1987
- Trinity River Basin Fish and Wildlife Task Force "Trinity River Basin Fish and Wildlife Management Program" State of California, Department of Water Resources, Red Bluff, CA, March 1982
- USDA, Forest Service "Timber Management Plan" Shasta-Trinity National Forests, Shasta and Trinity Working Circles, 1975
- USDA, Forest Service "Timber Management Plan Final Environmental Statement" Shasta-Trinity National Forests. 1975
- USDA, Forest Service "Coordinating Wildlife with Timber Management" Pacific Southern Region, Tahoe National Forest, Nevada City, CA, 1975
- USDA, Forest Service "Summer Steelhead Management Direction" Pacific Southwest Region, San Francisco, CA, September 1986
- USDA, Forest Service "Model Steelhead Stream Demonstration Project Plan" Pacific Southwest Region. Shasta-Trinity National Forests, Redding, CA, December 1985
- USDA, Forest Service "Rise to the Future" Washington, D C , March 1987

- USDA, Forest Service, and State of California, DFG "Partners in Fish". Pacific Southwest Region, San Francisco, CA, May 1987
- USDA, Forest Service "Rise to the Future" Pacific Southwest Region, San Francisco, CA, October 1987
- USDA, Forest Service "Synopsis of the Shasta-Trinity National Forests Fish and Wildlife Management Program" Pacific Southwest Region, Redding, CA, October 1989
- USDA, Forest Service "Shasta-Trinity National Forests Fish and Wildlife Management Program" (In Preparation) Pacific Southwest Region, Redding, CA
- USDA, Forest Service "The Pacific Southwest Region Today - Working Draft" Pacific Southwest Region, San Francisco, CA, 1980
- USDA, Forest Service "The Pacific Crest Trail-Guide for Location, Design and Management" Washington, D C . 1971
- USDA, Forest Service "Pacific Crest National Scenic Trail Interim Management Plan" Pacific Southwest Region, Shasta-Trinity National Forests, Redding, CA, 1979
- USDA, Forest Service "An Assessment of the Forest and Range Land Situation in the United States" Washington, D C , 1980
- USDA, Forest Service "Pacific Southwest Regional Guide" Pacific Southwest Region, January 1984, revised
- USDA, Forest Service "America's Renewable Resources A Supplement to the 1979 Assessment of the Forest and Range Land Situation in the United States" February 1984
- USDA, Forest Service "An Analysis of the Timber Situation in the United States. 1952-2030" December 1982
- USDA, Forest Service "Silvicultural Systems for the Major Forest Types of the United States" Agric Handbook No 445 December 1983
- USDA, Forest Service "The Scientific Basis for Silvicultural and Management Decisions in the National Forest System" Gen Tech Report WO-55 September 1989
- USDA, Forest Service "The South's Fourth Forest, Alternatives for the Future, Review Draft" 1986
- USDA, Forest Service "Water Quality Management for National Forest System Lands in California" Pacific Southwest Region, 1979
- USDA, Forest Service. "Uneven-aged Silviculture and Management in the United States" Combined Proceedings of two in-service workshops held in Morgantown, West Virginia, July 1975, and in Redding, California, October 1976 Timber Management Research, Washington, D C , 1978
- USDA, Forest Service "Vegetation Management for Reforestation" Final Environmental Impact Statement, Pacific Southwest Region, December 1988
- USDA, Forest Service "Focus on Action " Pacific Southwest Region 1992
- USDA, Forest Service "Wildlife and Fisheries Habitat Improvement Handbook" December 1988
- US Department of Commerce "Industry - Specific Gross Output Multipliers for BEA Economics Areas" Bureau of Economic Analysis, January 1977
- US Department of Interior "Klamath River Basin Fisheries Resource Plan" Bureau of Indian Affairs, Area Office, Sacramento, CA, February 1985
- US Department of Interior "Habitat as a Basis for Environmental Assessment" Fish and Wildlife Service, 101 ESM, Transmittal Sheet
- US Department of Interior "National Survey of Hunting, Fishing, and Wildlife Associated Recreation" Fish and Wildlife Service, Washington, D C , 1975
- US Department of Interior "Trinity River Basin Fish and Wildlife Management Program - Final Environmental Impact Statement" Fish and Wildlife Service, Division of Ecological Services, Sacramento, CA, October 1983
- US Department of Interior "The Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings" National Park Service. 1983
- US Department of Interior "Magnitude and Frequency of Floods in California" Geological Survey, 1977

Chapter VII - Bibliography

Water Resources Council "The Principles and Standards for Planning Water and Related Resources" Washington, D C , September 1973

Water Resources Council "Draft Guidelines for Implementing the Principles and Standards for Wild, Scenic, and Recreational Rivers" Washington, D C , September 1975

Zeiner, D C , WF Laudenslayer Jr, K E Mayer, and M White "California's Wildlife" California Department of Fish and Game Vol II Birds 1990

Zeiner, D C , WF Laudenslayer Jr, K E. Mayer, and M White "California's Wildlife" California Department of Fish and Game Vol I Amphibians and Reptiles 1988

Zeiner, D C , WF Laudenslayer Jr, K E Mayer, and M White "California's Wildlife" California Department of Fish and Game Vol III Mammals 1990

Chapter VIII

Glossary

CHAPTER VIII

Glossary

Abbreviations

Listed below are abbreviations and acronyms used in the Final EIS and Forest Plan. An asterisk means it is further defined in this glossary (see Definitions).

AMS	Analysis of the Management Situation*	FEMAT	Forest Ecosystem Management Assessment Team
AQRV	Air Quality Related Values	FUD	Fish User Day*
ASQ	Allowable Sale Quantity*	FWIP	Forest Watershed Improvement Program
AM	Animal Month*	GIS	Geographic Information System*
AMA	Adaptive Management Area*	GRI	Geologic Resource Inventory
AWA	Administratively Withdrawn Area*	GTR	Green Tree Retention*
BLM	Bureau of Land Management	HCA	Habitat Conservation Area*
BMPs	Best Management Practices*	IAP	Interim Artificial Propagation*
BSS	Base Sale Schedule*	IPM	Integrated Pest Management*
CALTRANS	California Department of Transportation	KGRA	Known Geothermal Resource Area
CDF	California Department of Forestry & Fire Protection	LAC	Limits of Acceptable Change'
CFS	Cubic Foot per Second*	LSR	Late-Successional Reserve*
CHA	Critical Habitat Area*	LTSY	Long Term Sustained Yield*
CHU	Critical Habitat Unit*	MBF	Thousand Board Feet
CMAI	Culmination of Mean Annual Increment*	MIRs	Minimum Implementation Requirements*
CRA	Congressionally Reserved Area*	MIS	Management Indicator Species* or Management Indicator Assemblages*
DBH	Diameter at Breast Height*	MMBF	Million Board Feet
DCA	Designated Capability Area*	MMRs	Minimum Management Requirements*
DFC	Desired Future Condition*	NASA	National Aeronautical & Space Administration
DFG	California Department of Fish and Game	NEPA	National Environmental Policy Act
EA	Environmental Assessment*	NFMA	National Forest Management Act*
EPA	Environmental Protection Agency	NPBs	Net Public Benefits*
ERA	Equivalent Road Acre*	NTMB	Neotropical Migratory Birds*
EUI	Ecological Unit Inventories*	OHV	Off-highway Vehicle*
		PAOT	People-at-one-time*
		PNV	Present Net Value*
		RAMPREP	Resource Allocation Model Preparation*
		RARE	Roadless Area Review and Evaluation

RIM	Recreation Information Management
RMZ	Riparian Management Zone
RN	Roaded Natural (see Recreation Opportunity Spectrum [ROS])*
RNA	Research Natural Area
RPA	Forest and Rangeland Renewable Resources Planning Act of 1974*
ROD	Record of Decision*
ROS	Recreation Opportunity Spectrum*
RR	Riparian Reserve*
RVD	Recreation Visitor Day*
SAOT	Skien-at-one-time*
SIA	Special Interest Area*
SPM	Semi-primitive Motorized (see ROS)*
SPNM	Semi-primitive Non-motorized (see ROS)*
SRI	Soils Resource Inventory
TE&S	Threatened Endangered and Sensitive Species
TOC	Threshold of Concern*
TSI	Timber Stand Improvement*
USC	United States Code
USGS	U.S. Geological Survey
VAC	Visual Absorption Capability*
VQI	Visual Quality Index*
VQO	Visual Quality Objective
WARS	Wilderness Attribute Rating System*
WHR	Wildlife Habitat Relationship*
WRC	Water Resource Council, U.S.
WUD	Wildlife User Day*

Definitions

This glossary gives definitions of terms in the Final EIS and Forest Plan

A

"aa" (pronounced ah ah) type lavaflow
 A Hawaiian term for basaltic lava flows typified by a rough, jagged, spinose, clinkery surface (Dictionary of Geological Terms, Doubleday 1976)

acre-foot
 The volume of water or sediment equal to the amount that would cover one acre to a depth of one foot (43,560 cubic feet, 326,000 gallons)

adaptive management
 A continuing process of action-based planning, monitoring, researching, evaluating, and adjusting with the objective of improving implementation and achieving the goals of the selected alternative

adaptive management areas (AMA)
 Landscape units designated for development and testing of technical and social approaches to achieving desired ecological, economic, and other social objectives

adfluvial
 Refer to lake-dwelling fish that ascend streams to spawn, like kokanee

Administratively Withdrawn Areas (AWA)
 Areas removed from the suitable timber base through agency direction and land management plans

adopted visual quality objective
 The level of visual quality to which the landscape will actually be managed (see visual quality objective [VQO])

allocation
 The assignment of sets of management practices (prescriptions) to particular land areas to achieve the goals and objectives of the alternative

allowable sale quantity (ASQ)
 The quantity of timber that may be sold from the area of suitable timber land in an alternative. This quantity is usually expressed on an annual basis as the "average annual allowable sale quantity." ASQ is normally expressed in board feet or cubic feet

Alquist-Priolo Special Fault Study Zones
 The Alquist-Priolo Special Studies Zones Act was enacted in 1976 by the California Legislature with the purpose of providing maps of specific seismic hazards, or earthquake potential. These maps are used to regulate development near active faults in order to mitigate the hazard of surface fault-rupture. Regulation within

<p>the zones is carried out mainly by the cities and counties that issue development permits</p> <p>alternative In forest planning, a given combination of resource uses and a mix of management practices that achieve a desired management direction, goal, or emphasis.</p> <p>ambient air quality Air quality environment</p> <p>amenity (amenity value) Typically used in land management planning to describe those resources for which market values (or proxy values) are not or cannot be established</p> <p>anadromous fish Those species of fish that live in saltwater most of their lives, after migrating from their fresh water beginnings. As adults, they migrate back into fresh water streams to spawn. Examples are salmon, steelhead and shad</p> <p>analysis area An analysis area is an aggregate of capability areas that responds in a uniform way to a given management prescription</p> <p>analysis of the management situation (AMS) A step in forest planning in which the forests' ability to supply goods and services in response to society's demand for those goods and services is determined</p> <p>animal month (AM) The quantity of forage required by one mature cow for one month. (For land management planning purposes, the Pacific Southwest Region uses 1,000 pounds/month or 30 pounds/day)</p> <p>area of influence A delineated geographic area within which the present or proposed actions of a forest unit exert an important influence on residents and visitors</p> <p>arterial (road) See "road"</p> <p>aspect The compass direction that the slope of a land surface faces (e.g., north, northwest, south)</p> <p>assessment The renewable resources assessment required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)</p>	<p>assigned value A monetary value that represents the price consumers would be willing to pay for the Forests' outputs, whether or not such prices are actually paid to the Federal Government. In forest planning the term "assigned value" refers to both market and non-market outputs, because it is National policy to provide most of the forests' outputs at either no charge to consumers or at a price less than the willingness to pay</p> <hr/> <p>B</p> <p>background View beginning 3 to 5 miles from the observer and as far into the distance as the eye can detect the presence of objects. Skylines or ridge lines against other land surfaces are the strongest visual elements of the "background"</p> <p>background level (background, natural background level) The environmental conditions that exist prior to active management taking place</p> <p>backlog Work which needs to be completed by the Forest Service, such as reforestation, timber stand improvement, slash disposal, and land line location</p> <p>basal area The cross-sectional area of a stand of trees measured at 4.5 feet above the ground, expressed in square feet</p> <p>base sale schedule (BSS) A timber sale schedule formulated on the basis that the quantity of timber planned for sale and harvest for any future decade is equal to or greater than the planned sale and harvest for the preceding decade. This planned sale and harvest for any decade is not greater than the long-term sustained yield capacity</p> <p>benchmark An analysis of the supply potential of a particular resource, or of a set of resources subject to specific management objectives or constraints. Benchmarks define the limits within which alternatives can be formulated</p> <p>benefit The total value of an output or other outcome. (Negative or non-beneficial outputs or effects should be included in total benefits)</p>
---	---

benefit-cost analysis

An analytical approach to making choices on the basis of receiving the greatest benefit for a given cost or producing the required level of benefits at the lowest cost. The same analytical process has also been referred to as cost effectiveness analysis when the benefits cannot be quantified in terms of dollars.

benefit-cost ratio

Measure of economic efficiency, computed by dividing total benefits by total costs. Usually both benefits and costs are discounted to present values.

best management practices (BMPs)

A practice or a combination of practices that have been determined to be the most effective, practicable means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals. These practices have been certified by the State of California Water Resources Control Board and approved by the Environmental Protection Agency as the best means to control non-point pollution.

biolink

See "Trinity Divide Biolink"

biological growth potential

The average net growth attainable in a fully stocked natural forest stand (or land).

biomass

The total mass (e.g., weight, volume) of living organisms in a biological system (Odum, 1971). For purposes of this document, biomass is the above-ground portions of shrubs and trees, excluding material that meets commercial sawlog specifications.

biological diversity, or biodiversity

Species diversity - i.e., number of different species occurring in a location or under the same condition. It also refers to the variety of habitats and conditions in an area.

board foot

Lumber or timber measurement term. The amount of wood contained in an unfinished board 1 inch thick, 12 inches long, and 12 inches wide.

bone-dried (tons)

A measurement of biomass, wood dried to a constant weight with a standard moisture content of 10% (oven dried).

broadcast burning

A technique of applying fire to target fuels which ignites all burnable material over the entire unit being treated.

browse

Leaf and twig growth of shrubs, woody vines. Also shrubs and/or trees favorable and available for animal consumption.

burning prescription

Written direction stipulating fire environment conditions, techniques, and administrative constraints necessary to achieve specified resource management objectives by use of fire on a given area of land.

buy-out

Federal Timber Contract Payment Modification Act (98 STAT 2213, 16 U.S.C. 618). Allows timber companies to buy out of timber sale contracts at a reduced amount in lieu of the original contract price.

C

canopy

The more or less continuous cover of leaves and branches collectively formed by the crowns of adjacent trees in a stand or forest. Canopy cover varies by the number of trees in an area.

capability

The potential of an area of land to produce resources, supply goods and services, and allow resource uses under an assumed set of management practices and at a given level of management intensity. Capability depends upon site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

capability area

The smallest unit of land or water used in forest planning. A discrete and recognizable unit, classified primarily according to physical (soil), administrative, and biological factors. All land within a capability area is homogeneous in ability to produce resource outputs and in production limitations.

carrying capacity

The number of individuals in a given species that can survive in, and not cause deterioration to, an ecosystem through the least favorable environmental conditions that occur within a given interval of time.

chain

A measure of distance equivalent to 66 feet

chaparral

A vegetation community that consists primarily of shrub species such as chamise and ceanothus.

chargeable volume

All volume that is included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity, based on Regional utilization standards. Consistent with the definition of timber production, planned production of firewood is not included in the allowable sale quantity and therefore is non-chargeable

class (with regard to visual quality)

For visual condition classes, see "Visual condition"

class I area

An area designated for the most stringent degree of protection from future degradation of air quality. The Clean Air Act designates as Mandatory Class I areas each National Park over 6,000 acres and each national wilderness over 5,000 acres, that was designated with the passage of the 1964 Wilderness Act

Clean Water Act

Law enacted by the United States Congress in 1972, as amended in 1977 and 1980, whose objective is to restore and maintain the chemical, physical and biological integrity of the Nation's water

clearcutting

Removal of all the merchantable trees in a stand in one cutting operation to help establish a new even-aged stand. Clearcutting does not necessarily mean that all unmerchantable trees are removed

climax

The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition. See "Succession"

coldwater fishery

Stream and lake waters which support predominantly coldwater species of fish. These fish have maximum sustained water temperature tolerances of about 70 degrees Fahrenheit. Salmon and trout are examples

collector road

See "road".

commercial species

Tree species, such as Douglas-fir and ponderosa pine, suitable for industrial wood products

commodity

A transportable resource product with commercial value

community cohesion

The degree of unity and cooperation within a community in achieving its goals

community stability

The capacity of a community to absorb and/or cope with change without major hardships to groups or institutions within the community

compatible uses

Land uses which can exist together so that no one use improves or detracts from the quality of another. In practice this definition is usually relaxed to include uses which can coexist and conflict only slightly

conflicting uses

Land uses by which the quality of each individual use is harmed by the other's uses when they occur together in the same area. This is due either to competition for limited resources or from by-products which damage alternative uses

Congressional Reserved Areas (CRA)

Areas that require Congressional enactment for their establishment, such as National Parks, National Monuments and Wilderness. These are also referred to as Congressional Reserves

constraint

Limitations, actions which cannot, or must be taken

consumer surplus

The difference between the total cost to consumers for a good or service and the amount each individual would be willing to pay rather than do without it

consumptive use

Use of a resource that reduces the supply

consumptive wildlife

Animal species that are hunted or trapped such as deer, quail, or beaver

cool burn prescriptions

Prescriptions that result in low intense flames

cord

A stack of wood measuring 4 feet high, 4 feet deep, and 8 feet long. In wood volume, two cords equal roughly 1,000 board feet

comdor

A linear strip of land identified for the present or future location of transportation or utility rights-of-way within its boundaries. An area that provides connectivity or migration routes for wildlife to travel between habitats. Streamside areas are an example.

cost

The price paid or what is given up in order to acquire, produce, accomplish, or maintain anything.

cost, administrative

Costs of required general administration which are prorated over fixed, variable, and investment costs.

cost, economic

Total fixed and variable costs for inputs, including costs incurred by other public and private parties, and opportunity costs. Economic costs include adjustment for cost savings, and opportunity costs, if any.

cost-effective analysis

A benefit-cost analysis process utilized when all benefits of the alternatives cannot be quantified in terms of dollars (US General Account Office, 1969). Cost effectiveness analysis compares alternatives in terms of their contribution to a goal by using costs and other effectiveness criteria.

cost, fixed

Costs of the minimal level of activities committed for the planning period.

costs, maintenance level

Costs of activities needed to meet legal requirements (other than contractual) and costs needed to protect and maintain assets in the absence of controllable use.

cost, variable

Costs of program activities above the maintenance level.

cover type

Refer to actual stands of any vegetation type, whether dominated by tree, shrub, or grass species.

critical habitat area (CHA)

Critical habitat area (CHA) and critical habitat unit (CHU) have been used interchangeably and for all intent and purpose, are one in the same. CHNCHU is the specific area within a geographic area occupied by a species on which are found those physical and biological features (1) essential to the conservation of the species, and (2) that may require special management considerations or protection. A CHNCHU normally would refer to a specific (U)nit or (A)rea of critical

habitat and designated by a specific number, i.e., CHU34.

critical habitat unit (CHU)

Critical habitat unit (CHU) and critical habitat area (CHA) have been used interchangeably and for all intent and purpose, are one in the same. CHU/CHA is the specific area within a geographic area occupied by a species on which are found those physical and biological features (1) essential to the conservation of the species, and (2) that may require special management considerations or protection. A CHU/CHA normally would refer to a specific (U)nit or (A)rea of critical habitat and designated by a specific number, i.e., CHU34.

crown

The upper part of a tree or other woody plant carrying the main branch system and foliage above a more or less clean stem(s).

cubic foot per second (CFS)

Unit of measure of streamflow or discharge, equivalent to 449 gallons per minute, or about 2 acre-feet per day.

culmination of mean annual increment (CMAI)

The point where the average annual growth of a stand of timber no longer increases.

cultural resources

Tangible and intangible aspects of cultural systems, living and dead, that are valued by a given culture or contain information about the culture. Cultural resources include, but are not limited to, sites, structures, buildings, districts, and objects associated with or representative of people, cultures, and human activities and events.

cumulative watershed impacts

All impacts on beneficial uses of water and soil located outside of primary land use sites. They are the additive or synergistic effects of multiple actions within a watershed. Cumulative effects occur as a result of more than one action and the changes may either enhance or degrade water quality.

D

demand analysis

A study of the factors affecting the quantity and price of a good and/or service that would be used as purchased by consumers if made available.

demand schedule

The relationship between price and quantity demanded. The demand schedule expresses how

much of the good or service would be bought or consumed at various prices at a particular point in time

departure

A level of timber production that allows the planned sale and harvest to drop in a future decade (as opposed to non-declining yield) See "non-declining yield"

designated capability area (DCA)

A contiguous area of habitat to be managed and conserved for spotted owls

designated wildlife areas

In reference to wildlife, specifically refers to lands presently identified (or those which may be identified) as displaying the proper habitat attributes necessary for or capable of helping to support a viable population of a given species. Field investigation, manual map overlays, and computer searches of the forests' land base may all assist in designating these areas. Key designated areas include important winter range, fawning areas, transition range, and roost sites

desired future condition (DFC)

The desired condition of the landscape expressed in terms of the biotic and abiotic components of the ecosystem and includes the social, economic and cultural elements

developed recreation

A recreation development site outside of the National Wilderness Preservation System with suitable characteristics for accommodation of intensive recreation activities. Development sites can be either potential or existing

diameter at breast high (DBH)

Diameter of a tree measured 4 feet 6 inches from the ground

direct effect (primary effect)

A condition caused by an action or inaction without an intermediary causal agent, an effect characterized by a close causal relationship

discounting

Discounting reduces future costs and benefits to reflect the decreased future value and enables comparisons to be made of benefits and costs occurring at different points in time

discount rate

An interest rate that reflects the cost or time value of money. It is used in discounting future costs and benefits

discretionary resources

Resources considered in the Forest Plan where the choices of allocation are not limited by laws and/or regulations, or by unique, site-specific sets of physical-environmental requirements. Timber, recreation, and wildlife are examples of discretionary allocations

dispersed recreation

Outdoor recreation that occurs outside planned and maintained recreational facilities (e.g., scenic driving, hunting, backpacking, and camping in undeveloped areas)

distance zones

Areas of landscapes denoted by specified distances from the observer. Used as a frame of reference in which to discuss landscape characteristics or activities of man

disturbed

See "Visual condition"

diversity

Variety of different plant and animal communities and species within the area

drastic disturbance

See "Visual condition"

E

ecological unit inventory (EUI)

The mapping of ecological units in a coordinated, interdisciplinary manner. Ecological unit inventories include ecological types of both terrestrial and aquatic ecosystems. National direction for ecological classification and inventory is contained in FSM 2060 and FSH 2090. 11

ecological type

A category of land having a unique combination of potential natural vegetation, soil, geomorphic process, landform, lithology, climate, and differing from other ecological types in its ability to produce vegetation and respond to management. Riparian areas and wetlands are included in terrestrial ecological types

economic efficiency analysis

A comparison of the values of resource inputs (costs) required for a possible course of action with the values of resource outputs (benefits) resulting from such action. In this analysis, incremental market and non-market benefits are compared with investment and physical resource inputs

ecosystem management

The use of an ecological approach in land management to sustain diverse, healthy, and productive ecosystems. Ecosystem management is applied at various scales to blend long-term societal and environmental values in a dynamic manner that may be adapted as more knowledge is gained through research and experience.

ecotone

A transition zone between two or more vegetation communities. It may have considerable linear length and is narrower than the adjoining community areas themselves. The ecotonal community commonly contains many of the organisms of each of the overlapping communities and, in addition, organisms which are characteristic of and often restricted to the ecotone. Often, the number of species in the ecotone is greater than in the communities flanking it. Organisms which occur primarily or most abundantly or spend the greatest amount of time in junctional communities are often called "edge species."

endangered species

Any species listed as such in the Federal Register which is in danger of extinction throughout all or a significant portion of its range.

endemic organism

Species whose natural range is confined to a certain region and whose distribution is relatively limited.

environmental assessment (EA)

An analysis of alternative actions and their predictable short and/or long-term environmental effects, which include physical, biological, economic, social, and environmental design factors and their interactions. An Environmental Assessment is the concise public document required by the regulations for implementing the procedural requirements of National Environmental Policy Act (NEPA).

ephemeral

Lasting or existing briefly, temporary.

ephemeral stream

A stream or reach of a stream that flows briefly only in direct response to storm runoff or seasonal snowmelt and whose channel is at all times above the water table.

equivalent road acre (ERA)

A unit of measure used in cumulative watershed impact analyses which represents the equivalent disturbance of one acre of roaded area. Disturbances primarily include soil exposure and compaction.

erosion gully

The removal of soil by the formation of relatively large channels or gullies cut into the soil by concentrated surface runoff.

erosion, soil

The detachment and movement of soil from the land surface by wind and water.

erosion, surface

Erosion which removes materials from the surface of the land as distinguished from gully or channel erosion. The two main types of surface erosion are sheet erosion and rill erosion.

esthetics

Evaluations and considerations concerned with the sensory quality of resources (sight, sound, smell, taste, and touch) and especially with respect to judgment about their pleasurable qualities.

ethnographic

The study of contemporary cultural groups.

eutrophication

The natural process of maturing of a lake. In general, and within limits, productivity increases as a lake ages. An eutrophic lake may characteristically be shallow in depth and rich in nutrients. Littoral (shoreline) vegetation may be more abundant and plankton populations denser. Because of heavy organic content, summer stagnation may be severe enough to exclude coldwater fishes, however, a lake is probably suitable for perch, pike, bass, and other warmwater fishes. (Shasta Lake is a lake experiencing eutrophication unlike Trinity Lake which is referred to as an oligotrophic lake which means nutrient poor.)

evapotranspiration

The conversion of water, whether open or as soil moisture or within plants, into water vapor that is released to the atmosphere.

even-aged stand

A forest stand composed of trees having no, or relatively small, differences in age.

even-aged timber management

The combination of actions that results in the creation of stands in which trees of essentially the same age grow together. Managed even-aged forests are characterized by a distribution of the stands of varying ages (and therefore tree sizes) throughout the forest area. The difference in age between trees forming the main canopy level of a stand usually does not exceed 20

percent of the age of the stand at harvest rotation age
Regeneration in a particular stand is obtained during a short period at or near the time that a stand has reached the desired age or size for regeneration and is harvested. Clearcut, shelterwood, or seed tree cutting methods produce even-aged stands

extirpated

To wipe out or make extinct - some species have been extirpated from areas

F

fine sediments

Small particles in the mixture of stream bottom (spawning) gravels that are less than 6.4 millimeters in size

fire break

A natural or artificial barrier usually created by the removal of vegetation and used to prevent or retard the spread of fire

fish habitat

The aquatic environment and the surrounding terrestrial environment that, combined, afford the necessary physical and biological support systems required by fish species during various life history stages

fish user day (FUD)

Twelve hours of recreation use oriented to fish

forage

All plants available for grazing or browsing by wildlife or harvested for feeding livestock

forb

Any herbaceous plant other than those in the Gramineae (true grasses), Cyperaceae (sedges), and Juncaceae (rushes) families, e.g., wildflowers. A broad-leaved flowering herb whose stem above ground does not become woody and persistent

foreground

The portions of a view between the observer and up to 1/4 to 1/8 mile distant. The surface patterns on objects and visual elements are important in the "foreground" portions of views. Observers are able to relate themselves to the size of individual visual elements (such as a tree) and are able to begin to sense their scale relationship to the landscape. Aerial perspective is absent or insignificant in the "foreground," and the intensity and lightness or darkness colors are seen in maximum contrast. Wind motion in trees or

on grass can be seen in this close-in area but seldom beyond

Forest and Rangeland Renewable Resource Planning Act of 1974 (RPA)

An act of Congress that responded to the need for coordinated, long-range planning of resource uses within the National Forests

forest cover type

A classification of forest land referring to a group of timber stands of similar development and species composition. Examples in California include Douglas-fir, mixed conifer, and the true fir types

forest leadership team

Comprised of the Forest Supervisor, Deputy Forest Supervisor, principal staff members from the Forest Supervisor's Office, and District Rangers

FORPLAN

A linear computer programming model used to assure that land allocations and output schedules for alternatives and benchmark are made in a way that meets all constraints in the most cost-efficient manner possible. In addition to being used to formulate alternatives and benchmark that are both feasible and cost efficient, FORPLAN is also used to perform detailed accounting work and to generate summary reports of information needed to construct the display tables in the Final EIS

fuel break

A wide strip of land strategically placed for fighting fires, where hazardous fuels have been replaced with less burnable fuels. Fuelbreak divide fire-prone areas into smaller parcels for easier fire control and provide access for fire fighting

fuel loading

The quantity of fuel per acre in a given area, expressed in tons per acre. Unless otherwise noted, this refers only to material which is dead or down on the forest floor

fuels

Any material capable of sustaining or carrying a forest fire, usually natural material both live and dead. Downed logs and branches are examples

G

geographic information system (GIS)

A computerized mapping system that enters, stores, updates, displays, analyzes, models and reports on information that is tied to known geographic locations

goal

A concise statement that describes a desired condition to be achieved sometime in the future. It is normally expressed in broad, general terms and is timeless in that it has no specific date for completion. Goal statements form the principal basis from which objectives are developed.

goods and services

The various outputs, including on-site uses, produced from forest and rangeland resources

grazing

Consumption of meadow or pasture vegetation by livestock and wildlife such as elk

green tree retention (GTR)

The practice of retaining live, growing trees on a site during timber regeneration harvests as a future source of trees and snags for wildlife. An average of six to twelve trees per acre that exceed the average stand diameter are normally retained.

The definition is similar to the term "legacy retention" used by the Six Rivers National Forest, and the term "regeneration with reserves" used by the Klamath National Forest.

guideline

See standard and guideline

H

habitat

A place where a plant or animal naturally or normally lives or grows. For wildlife, habitat is made up of four components: food, water, cover, and space.

habitat conservation area (HCA)

An area established for the conservation of northern spotted owl populations.

habitat element

A component of wildlife habitat. Snags and hardwoods are examples.

habitat matrix

A tabular valuation of wildlife habitat for all wildlife species.

hatchery

Any premises upon which breeding, hatching or fish-rearing facilities are situated when such premises are required to have a license by the state fish and game code, including ponds for commercial use.

herbicide

A substance used to inhibit or destroy plant growth. If its effectiveness is restricted to a specific plant or type of plant, it is known as a selective herbicide. If its effectiveness covers a broad range of plants, it is considered to be non-selective herbicide.

incompatible uses

Land uses which cannot exist together by reason of either competition for limited resources or use by-products which prevent the alternative use. For example, timber harvesting and wilderness preservation are incompatible uses for one piece of land.

indicator species

A particular species of plant or animal whose presence in a certain situation or location is a fairly certain sign or symptom that particular environmental conditions are also present (management indicator species).

indirect effect (secondary effect)

A condition caused by an action or inaction through intermediary causal agents. An effect for which the causal linkages to the action or inaction are not readily apparent. Indirect effect contrasts with direct effect. This is not a measure of importance, but merely a classification by causal linkages. Direct effects are usually easier to detect and measure with certainty, but they may be either more or less important than indirect effects.

induced fish and wildlife outputs

Measurements of work accomplished by other resource functions to the benefit of fish and wildlife.

inner gorge

A stream reach bounded by steep valley walls which terminate up a more gentle topography. Common in areas of rapid stream down or uplift, such as Northern California and Southwest Oregon. Walls must be 65 percent slope or greater.

input-output analysis (interindustry analysis, Leontief analysis)

A quantitative study of the interdependence of a group of activities based on the relationship between inputs and outputs of the activities. The basic tool of analysis is a square input-output table, interaction model, for a given period that shows simultaneously for each activity the value of inputs and outputs, as well as the value of transactions within each activity itself. It has been especially applied to the economy and the industries into which the economy can be divided.

inputs

Land, labor, and capital required to produce outputs. Inputs are generally represented by activity costs.

integrated pest management (IPM)

A process for selecting strategies to regulate forest pests in which all aspects of a pest-host system are studied and weighed. The information considered in selecting appropriate strategies includes the impact of the unregulated pest population on various resource values, alternative regulatory tactics and strategies, and benefit/cost estimates for these alternative strategies. Regulatory strategies are based on sound silvicultural practices and ecology of the pest-host system and consist of a combination of tactics such as timber stand improvement plus selective use of pesticides. A basic principle in the choice of strategy is that it be ecologically compatible or acceptable.

interdisciplinary (ID) team

A group of individuals with different skills and training assembled as a team to solve a problem or perform a task (assembled out of recognition that no one scientific discipline is sufficiently broad to adequately solve a problem). Members of the team proceed to a solution with frequent interaction so that each discipline may provide insights to any stage of the problem and disciplines may combine to provide new solutions. Thus it differs from a multi-disciplinary team where each specialist is assigned a portion of the problem and their partial solutions are linked together to provide the final solution.

interim artificial propagation (IAP)

Augmentation of existing fish stocks on mainstem watercourses and/or their tributaries using aquacultural methods on a well-defined time-limited basis emphasizing use of natural and/or wild stock fish. IAP is an element of bioenhancement. Natural stock progeny of natural self-reproducing anadromous salmonids regardless of ancestry. Wild stock, natural self-reproducing stocks that have not been supplemented or augmented with artificially produced fish.

intermittent stream

A stream or reach of a stream that flows above ground only at certain times of the year, as when it receives water from springs or from some surface source. A stream which, in general, flows only during wet periods and is dry during dry periods.

irreversible/irrecoverable effects

Any effect of an action or inaction which (due to physical, biological, or socioeconomic constraints) cannot be recovered (by returning the object of the effect to its previous condition) within a reasonable length of time.

issue

A matter that is in dispute between two or more parties, a point of debate or controversy.

K

Key Watershed

As defined by National Forest and Bureau of Land Management District biologists, a watershed containing (1) habitat for potentially threatened species or stocks of anadromous salmonids or other potentially threatened fish, or (2) greater than 6 square miles with high-quality water and fish habitat.

L

Land and Water Conservation Fund Act (78 Stat. 897, as amended, 16 U.S.C. 4601-4 to 4601-11, 23 U.S.C. 120 (Note))

Provides funds for the Federal acquisition and development of outdoor recreation resources.

landform

Term used to describe many types of land surfaces which exist as a result of geological activity, such as a plateau, plain, basin, mountain, etc.

landscape

A heterogeneous land area with interacting ecosystems that are repeated in similar form throughout.

Late-Successional Reserves (LSR)

A forest in its mature and/or old-growth stages that has been reserved under each option in the FEMAT report.

limits of acceptable change (LAC)

A planning process that consists of the following four main components: (1) the specification of acceptable and achievable resource and social conditions, defined by a series of measurable indicators, (2) an analysis of

the relationship between existing conditions and those judged acceptable, (3) identification of management actions necessary to achieve these conditions, and (4) a program of monitoring and evaluation of management effectiveness

linear programming

A mathematical method used to determine the most effective allocation of limited resources between competing demands when both the objective (e.g., profit or cost) and the restrictions on its attainment are expressible as a system of linear equalities or inequalities (e.g., $y = a + bx$)

local road

See "road"

long-term sustained yield (LTSY)

The highest uniform wood yield from lands being managed for timber production that may be sustained under a specified management intensity consistent with multiple-use objectives

M

macroinvertebrates

These are components of the aquatic environment that provide a connecting link in the food chain between multicelled periphyton, detritus from terrestrial sources and the fish population. They are essential as a food source because of their strict habitat requirements and are very useful as indicators of changes in aquatic habitat. The number, size and species of aquatic invertebrates are important to fish habitats as they are the primary food source for many trout and young salmon. Aquatic invertebrates include insects such as mayflies and stoneflies, crustaceans such as crayfish and shrimp, molluscs such as snails and clams, and fresh water earthworms. Terrestrial invertebrates are also an important food source.

major disturbance

See "visual condition"

Managed Late-Successional areas

Selected harvest areas and managed pair areas

management area

A contiguous area of land used in planning, usually consisting of differing analysis areas, to which one or more prescriptions are applied. Management areas do not vary between alternatives, however, the prescriptions applied to them do vary.

management direction

A statement of goals and objectives and the associated management prescriptions and standards and guidelines for attaining them.

management indicator assemblages

Groups of wildlife associated with vegetative communities or key habitat components that are used to monitor effects of management activities.

management indicator species (MIS)

See "indicator species"

management intensity

The level of output or use to be obtained on a given land area.

management practice

A specific activity, measure, course of action or treatment.

management prescription

Management practices and intensity selected and scheduled for application on a specific area to attain goals and objectives.

Market

The processes of exchanging a good or service for money or other goods or services according to a customary procedure. A market need not be an established institution located at a specific place.

market area

The area from which a market draws or to which it distributes its goods or services, and for which the same general prices and price influences prevail.

mass wasting

A general term for the dislodgement and downslope transport of soil and rock material under the direct application of gravity. Mass wasting includes slow displacement such as creep, and rapid displacement such as rockfalls, landslides and debris torrents.

mast

Nuts, acorns, and similar products of hardwood species, which are consumed by animals.

matrix

Federal lands outside of reserves, withdrawn areas, managed late-successional areas, and adaptive management areas.

maximum modification

See "visual quality objective (VQO)"

middleground (middle distance)

The portions of a view between 1/4 or 1/2 mile and three to five miles from the observer. The "middleground" portions of a view are especially critical because they tend to dominate the view. It is in this distance range that the emergence of shapes and patterns on the landscape can be clearly seen. Consequently, the "middleground" portions of a view often best show whether manmade changes rest easily or uneasily on the landscape.

millennia

A period of 1,000 years

mineral entry, withdrawals

The exclusion of mining locations and mineral development work on areas required for administrative sites by the Forest Service and other areas highly valued by the public.

minimal timber management

See timber management intensities

minimum implementation requirements (MIRs)

Requirements which are within agency control but at the forest level there is little discretionary control regarding the application of them on the ground. They are needed to ensure that alternatives are minimally acceptable and implementable on the ground.

minimum management requirements (MMRs)

Requirements which are outside of Forest Service authority to change (i.e., statutes and regulations in contrast to manual direction or agency policy).

minor disturbance

See "visual condition"

modification

See "visual quality objective (VQO)"

monoculture

The cultivation of a single timber species excluding others.

multi-disciplinary team

A joint effort by two or more people having different scientific training and/or backgrounds and assigned responsibilities in the same activity or effort. Each specialist assigned a portion of the problem and their individual solutions are combined to provide the complete solution.

multiple use

The management of all the various renewable surface resources of the National Forest so that they are utilized in the combination that will best meet the needs of all.

mustelid

A family of small active carnivorous mammals including many important furbearers and predators such as the mink and fisher.

N

National Environmental Policy Act of 1969 (NEPA)

An Act of Congress which declared a National policy to encourage productive and enjoyable harmony and protection of the environment.

National Forest Management Act of 1976 (NFMA)

Act of Congress that amended the Forest and Rangeland Renewable Resources Planning Act of 1974, to require and direct, among other things, the preparation of forest plans.

National Forest System

The National Forest System consists of units of Federally owned forest, range, and related lands throughout the United States and its territories, united into a nationally significant system dedicated to the long-term benefit for present and future generations. The National Forest system includes all National Forest system lands reserved or withdrawn from the public domain of the United States, all National Forest system lands acquired through purchase, exchange, donation, or other means, the National Grasslands and land utilization projects administered under Title III of the Bankhead-Jones Farm Tenant Act (50 Stat. 525, 7 U.S.C. 1010-1012), and other lands, waters, or interests therein which are administered by the Forest Service or are designated for administration through the Forest Service as a part of the system.

Natural diversity data base

The State's data base of recorded locations for important plant and animal species.

Natural openings

A natural (non-human-caused or induced) break in forest canopy with an understory predominately made up of herbaceous cover (grasses/forbs).

Net public benefits (NPBs)

An expression used to signify the overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects.

(costs) whether they can be quantitatively valued or not NPBs are measured by both quantitative and qualitative criteria rather than a single measure or index. The maximization of NPBs to be derived from management of units of the National Forest System is consistent with the principles of multiple use and sustained yield.

neotropical migratory birds (NTMB)

Birds that breed in North America and migrate to Central or South America during fall and winter. Population levels of these birds are of international concern.

nephelometric

Measure of suspended sediments in a water column (Fisheries term)

non-chargeable volume

All volume that is not included in the growth and yield projections for the selected management prescriptions used to arrive at the allowable sale quantity.

non-consumptive species

Wildlife species not "taken" for food, pelts, or sport, but normally, observed, studied, photographed, etc. (as opposed to harvest or consumptive species)

non-declining yield

Timber scheduled for harvest so that any given decade's production does not fall below the previous decade's production.

non-discretionary resources

Resources considered in the Forest Plan where the choices of allocation are limited by law and/or regulation, or by unique, site-specific sets of physical-environmental requirements. Wilderness, Research Natural Areas, and Wild and Scenic Rivers are examples of non-discretionary allocations.

non-market outputs

Forest outputs not normally exchanged in markets. In the Forest Service, the following are classified as non-market outputs: dispersed recreation, fish and wildlife user days, and water. Although not normally exchanged in markets, the Forest Service assigns proxy values for analysis purposes.

non-point source

Source is general rather than specific in location.

O

objective

A concise time-specific statement of measurable planned results that respond to pre-established goals.

It forms the basis for further planning to define the precise steps to be taken and resources to be used in achieving identified goals.

obliterate (roads)

Obliterate means to block a road's use as a transportation facility, remove any drainage structures, and return the land it occupies to full production.

off-highway vehicle (OHV)

Off-road vehicle, examples include 4-wheel drives, jeeps, motorcycles.

older over-mature habitat

Multi-layered large older over-mature tree stage generally with an average age of the dominant trees of over 100 years. These stands display obvious signs of decadence and contain at least three trees per acre (standing or down) (on the average) over 36 inches dbh. Referred to as old-growth habitat, or late seral-stage forests.

old-growth

See "older over-mature habitat"

opportunity cost

The value of benefits foregone or given up due to the effect of choosing another management alternative that either impacts existing outputs or shifts resources away from other activities so that they are no longer produced and their benefits are lost.

output

Goods, products, or services that are purchased, consumed, or utilized by people.

output, maintenance level

The amount of an output which will occur regardless of management activity.

overstory

That portion of the trees in a forest, with more than one roughly horizontal layer of foliage, which forms the upper or uppermost layer.

overstory removal

A timber cutting method applied to stands with two distinct age or size classes, the older (or larger) of which is merchantable and is removed. The removal should leave an adequately stocked stand of understory trees.

P

partial retention

See "visual quality objective (VQO)"

perennial stream

A stream or reach of a stream that flows continuously throughout the year and whose upper surface generally stands lower than the water table in the region adjoining the stream

people-at-one-time (PAOT)

A public recreational usage measurement term. The number of people in an area or using a facility at the same time. Generally used as "maximum PAOT" to indicate capacity of an area or facility to support peak usage loads.

pest

An organism, plant or animal, which interferes with the attainment of the Forests' goals and objectives

pesticide

Any material, synthetic or natural, used to control populations of pests

pH

A measure of hydrogen-ion activity in solution expressed on a scale 0 (highly acid) to 14 (highly basic), 7.0 pH is a neutral solution, neither acid nor basic (Fetgh, 1973)

planned ignition

A fire started by deliberate management action

planning area

The area of the National Forest System covered by a Forest Plan

planning horizon

The overall time period considered in the planning process that spans all activities covered in the analysis or plan and all future conditions and effects of proposed actions which would influence the planning decisions (end of 16th decade / 160 year from current)

policy

A specific decision or set of decisions together with related actions designed for implementation

porosity

Porous, capable of absorbing moisture

prescribed burn

Intentional application of fire to wildland fuels in either their natural or modified state, under such conditions of weather, fuel moisture, soil moisture, etc. as allow the fire to be confined to a predetermined area and at the same time to produce the intensity of heat and rate of spread required to further ascertain planned objectives of silviculture, wildlife habitat, grazing, fire-hazard

reduction, etc. It seeks to employ fire scientifically so as to realize maximum net benefits with minimum damage at acceptable costs

present net value (PNV)

The difference between the discounted value (benefits) of all outputs to which monetary values or established market prices are assigned and the total discounted costs of managing the planning area

preservation

See "visual quality objective (VQO)"

price-quantity relationship

A schedule of prices that would prevail in a market for various quantities of the good or service exchanged

primitive recreation

See "recreation opportunity spectrum (ROS)"

program

The renewable resources program required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA)

project

A work schedule prescribed for a project area to accomplish management prescriptions, investments, maintenance, or protection

project planning (operation planning)

Types of planning concerned with physical undertakings (such as a dam). Project planning incorporates a greater range of specific elements than functional planning, and thus, deals with more numerous and diverse parts

proxy value

A value assigned to a good or service for evaluation purposes when the good or service is not bought or sold and an established monetary price does not exist

public issue

A subject or question of widespread public interest relating to management of the National Forest system

public participation activities

Meetings, conferences, seminars, workshops, tours, written comments, survey questionnaires, and similar activities designed or held to obtain comments from the general public and specific publics about National Forest system land management planning

pyroclastic

A clastic rock material formed by volcanic explosion or aerial expulsion from a volcanic vent

R

range allotment

An area designated for the use of a prescribed number and kind of livestock

range, primary

Areas which livestock prefer to graze and overuse will occur before livestock select a secondary range

range, secondary

Range which is lightly used or unused by livestock and will ordinarily not be significantly used until overuse of the primary range

range, transitory

Land temporarily suitable for grazing. For example, grass may cover the area before being replaced by growth not suitable for forage, such as forested vegetation

rate-of-return

Rate of interest at which the net discounted benefits equal the net discounted costs. (Internal rate-of-return is a similar measure appropriate to private firms)

real dollar value

A monetary value which compensates the effects of inflation

receipt shares

The portion of receipts derived from Forest Service resource management activities distributed to State and County governments, such as the Forest Service 25 percent fund payments

recreation opportunity spectrum (ROS)

A means of classifying and managing recreation opportunities based on physical setting, social setting, and managerial setting. Criteria results in five different ROS Classes briefly described below

Primitive (P) - An area 3 miles or more from roads and trails with motorized use, generally 5,000 acres or greater in size in essentially an unmodified natural environmental setting

Semi-Primitive Non-Motorized (SPNM) - An area 1/2 mile from roads and trails with motorized use. Generally 2,500 to 5,000 acres unless contiguous to primitive areas or wildernesses with subtle modifications to an otherwise natural setting.

Semi-Primitive Motorized (SPM) An area 1/2 mile from roads and trails with motorized use and generally 2,500 to 5,000 acres in size. May have moderately

dominant alterations to an essentially natural setting with motorized use of roads and trails

Roaded Natural (RN) - An area 1/2 mile or less from roads and trails and open to motorized use. Resource modifications and utilization practices are evident but harmonize with the natural environment

Rural (R) - The natural environment is substantially modified to the point that developments are dominant to the sensitive travel route observer. Structures are readily evident and may range from scattered to small dominant clusters. Pedestrian or other slow moving observers are constantly within view of culturally changed landscapes. Visitor contact is moderate to high. Controls and regulations are obvious and law enforcement is visible. Typical activities or facilities include but are not limited to camping, fishing, information centers, convenience stores, resorts, marinas, and downhill ski areas

recreation theme area

A conceptual organization of the recreation potential into geographic areas to provide a framework for examining recreational management opportunities. A list of recreation opportunities for each of the 12 theme areas appears in the Final EIS, Chapter III, "Recreation" section

The 12 recreation theme areas are

- 1 Rural Community Interface
- 2 Trinity Divide and Castle Crags
- 3 Mt. Shasta Recreation Area and Wilderness
- 4 McCloud River (upper, reservoir, lower)
- 5 Medicine Lake Highlands
- 6 Main Fork Trinity River
- 7 Trinity Alps Wilderness
- 8 Yolla Bolly and Chancelulla Wildernesses/Tedoc Mountain
- 9 South Fork Trinity River/Chinquapin
- 10 Shasta Unit of the National Recreation Area (NM)
- 11 Trinity Unit of the NM
- 12 Scenic Byways

recreation visitor day (RVD)

Defined as one person on site for a 12 hour period or any combination of people - i.e., 3 people on site for four hours each

recreational river area

Wild and Scenic River Act usage Those rivers or sections of rivers that are readily accessible by road or railroads, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past

record of decision (ROD)

As used in these documents, ROD commonly refers to the ROD "for Amendments to Forest Service and Bureau for Land Management Planning Documents Within the Range of the Northern Spotted Owl"

reforestation backlog

Suitable timber land which is currently not stocked with commercial trees species Lands occupied mainly with hardwoods, brush, or grasses scheduled for conversion to commercial conifers through reforestation

regeneration cutting

Applies generally to the logging stands of rotation age or greater, and of stands below rotation age which cannot economically be held any longer because of poor stocking, health, thrift, quality, or composition These cuttings are intended to replace the existing stands with a new stand

Research Natural Area (RNA)

An area established specifically to preserve a representative sample of an ecological community, primarily for scientific and educational purposes

reserve tree

Any tree or group of trees left unfelled in a harvest area that is being regenerated and kept as part of the new stand.

Resource Allocation Model Preparation (RAMPREP)

Pacific Southwest Region (Region 5) computer program for projecting timber growth and yields from existing and regenerated stands

Resource Amenity Emphasis Category

Individuals in this social category typically value natural resources more for their amenity and symbolic values than their economic conversion values For example, these individuals would prefer that local natural resource commodity items, such as timber, not be harvested but be retained for future generations See the Forest Plan, Chapter 3, for more information on this category

Resources Planning Act (RPA)

See Forest and Rangeland Renewable Resources Planning Act

Resource Utilization Emphasis Category

Individuals in this social category typically are directly or indirectly associated with the utilization/marketing of the natural resources in the impact area An example is those individuals whose occupations and/or political activities are associated with the wood products industry See the Forest Plan, Chapter 3, for more information on this category

responsible line officer

The Forest Service employee who has the authority to select and/or carry out a specific planning action

retention

See "visual quality objective (VQO)"

riparian area

Areas consisting of riparian ecosystems, aquatic ecosystems, or wetlands Referring to the land bordering a stream, lake, marsh, or wet meadow

Riparian Reserves (RR)

Designated riparian areas found outside late-successional reserves

rip-rap

Wall or foundation of stones placed together, e.g. for stream bank protection

rip-rap composition

Using large rock, boulders, concrete chunks or similar non-erosive objects as an armoring device for soil stability

risk cutting

Cutting to remove trees that are likely to die before the next periodic cut

road

Transportation route for motorized vehicles wider than 40 inches The three types of National Forest roads are arterial, collector, and local

Forest arterial road Serves large areas and usually connects with public highways or other Forest arterial roads to form an integrated network of primary travel routes Usually paved or chip sealed Travel speed 25 mph or greater Developed and operated for long-term management purposes and constant service

Forest collector road Serves smaller areas than arterial roads Collects traffic from Forest local roads and/or terminal facilities and is usually connected to a Forest arterial or public highway Typically has an aggregate, aggregate and oil, or chip seal surface. Travel speed 15-25 mph Road length. 5-15 miles. Operated for

constant or intermittent service depending on management objectives for the area

Forest local road Connects terminal facilities with Forest collector, arterial roads, or public highways Road may or may not have an aggregate surface Travel speed 5 mph Road length less than 5 miles, developed and operated for long or short term service, may be closed

road maintenance levels

The distinction between maintenance levels is not always sharply defined Some criteria may overlap two or more different maintenance levels Assignment at specific maintenance levels should be based on the criteria that best fits the management objectives for the road Some road management objectives, such as for interior campground road, may not be compatible with some of the following criteria In these situations, the desired level of user comfort and convenience should be used as the overriding criteria to determine the maintenance level

Level 1 Intermittent service roads during the time management direction requires that the road be closed or blocked to traffic Basic custodial maintenance is performed to protect the road investment and to keep damage to adjacent resources to an acceptable level Drainage facilities and runoff patterns are maintained

Level 2 This level is assigned where management direction requires that the road be open for limited passage of traffic Traffic is normally minor, usually consisting of one, or a combination of administrative, permitted, dispersed recreation, or other specialized uses Log haul may occur at this level Roads in this maintenance level are normally characterized as single lane, primitive type facilities intended for use by high clearance vehicles Passenger car traffic is excluded

Level 3 This level is assigned where management direction requires the road to be open and maintained for safe travel by a prudent driver in a passenger car Traffic volumes are minor to moderate Roads are normally characterized as low speed, single lane with turnouts and spot surfacing Some roads may be fully surfaced with either native or processed material The functional classification of these roads is normally local or minor collector

Level 4 This level is assigned where management direction requires the road to provide a moderate degree of user comfort and convenience at moderate travel speeds Traffic volumes are normally sufficient to require a double lane aggregate surfaced road Some roads may be single lane and some may be paved

and/or dust abated The functional classification of these roads is normally collector or minor arterial

Level 5 This level is assigned where management direction requires the road to provide a high degree of user comfort and convenience These roads are normally double lane, paved facilities Some may be aggregate surfaced and dust abated Functional classification of these roads is normally arterial

roaded natural recreation

See "recreation opportunity spectrum (ROS)"

rotation

The period of time between the initial timber stand establishment and the time when it is considered ready for cutting and regeneration

rural recreation

See "recreation opportunity spectrum (ROS)"

salvage cutting

Cutting primarily to utilize dead and downed material and scattered trees considered non-merchantable if left in the stand until the next scheduled cut

sanitation cutting

The removal of dead, diseased, infested, damaged, or susceptible trees essentially to prevent the spread of pests or pathogens and so promote forest hygiene

scenario

An outline or synopsis of a fixed sequence of future events in a defined environment

scenic river

Wild and Scenic Rivers Act usage Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads

selection logging (selection cutting)

Cutting method in which individual trees or small groups of trees are removed to create a stand with different sizes and age classes on the same site This results in an uneven-aged stand

semi-primitive motorized recreation (SPM)

See "recreation opportunity spectrum (ROS)"

semi-primitive non-motorized recreation (SPNM)

See "recreation opportunity spectrum (ROS)"

sensitive species

Species which have appeared in the Federal Register as proposed additions to the endangered or threatened species list, those which are on an official state list or are recognized by the Regional Forester to need special management in order to prevent them from becoming endangered or threatened

sensitivity level

A particular degree or measure of viewer interest in the scenic qualities of the landscape

seral

A biotic community which is a developmental, transitional stage in an ecologic succession.

seral stage

A stage or category that represents an ecologic successional time period. For example, an old-growth forest is a late seral stage

shelterwood system

Even-aged Silvicultural systems in which (in order to provide a source of seed and/or protection for regeneration) the old crop is removed in two or more successive "shelterwood cuttings," the first of which is ordinarily the seed tree cutting and the last is the final overstory removal cutting

silviculture

Generally, the science and art of cultivating (i.e., growing and tending) forest crops

silvicultural system

Establishing, growing and tending of forests. Systems are classified as even or uneven-aged according to the method of carrying out harvesting (extraction of timber)

site index

A numerical evaluation of the quality of land for plant productivity, especially used in forest land where it is determined by the rate of growth in height on one or more of the tree species

skiers-at-one-time (SAOT)

A public recreational usage measurement term. The number of skiers in an area or using a facility at the same time. Generally used as "maximum SAOT" to indicate capacity of an area or facility to support peak usage loads

slope gradient

Amount of elevation change per 100 feet, usually expressed as a percentage

snag

A standing dead tree from which the leaves and most of the branches have fallen. Snags are important for wildlife, especially for cavity nesters such as woodpeckers and wood ducks.

social categories

Individuals and groups of individuals are affected differently by Forest management activities primarily because of different social linkages to the Forest. Social categories have been formed based on historical and projected trends of user groups, public hearings, informal interviews of Forest personnel and users, and other government studies and documents, use surveys and census data. In the Forest Plan, Chapter 3, social categories are used to describe the various linkages and effects of management activities. These categories are (1) recreationists, (2) Native Americans, (3) resource amenity emphasis, and (4) resource utilization emphasis. Resource amenity emphasis and resource utilization emphasis categories are further defined in this glossary

special interest area (SIA)

Areas established and managed for their unique special feature. They include geological, historical, archaeological, botanical, and other memorable features

species assemblages

A collection of species sharing a common habitat or situation

spotted owl habitat area (SOHA)

Refer to habitat conservation area (HCA)

stand

A community of trees occupying a specific area sufficiently uniform in composition, age arrangement and condition distinguishable as a silvicultural or management unit. Typically, stand sizes vary from about 5 to over 30 acres on National Forest System lands

stand maintenance

A management practice which includes individual tree harvest by salvage and high-risk sanitation for the removal of fire-killed, insect infested, and dead trees, although other live trees may be cut in the process

standard and guideline

A principle requiring a specific level of attainment, a rule to measure against. It provides basic direction for implementation of management activities

standard service level

Management of recreation facilities which provides for vegetation management, full maintenance of facilities, appropriate toilet cleaning and garbage pick up, and information and interpretive services for the recreation user

stocking level

In a forest, a more or less subjective indication of the number of existing trees as compared to the desirable number for best results - e.g., maximum productivity of wood

strategy

A consideration of alternative means to reach an objective

sub-climax plant community

A successional stage of a vegetative type that is prior to the final stage

succession

The process of replacement of one plant community (age, composition, height and density) over time by another until the final (climax) or stable biotic community is reached

successional climax

See "succession"

successional stage

See "succession"

sustainable forest land

Land that is to be managed for timber production on a regulated basis in an alternative

sump

A depression at the lowest level to receive water and form a pool, allowing particulate matter to settle

sustained yield

A continuous supply or yield over time

synergistic

Cooperative or combined action between people or agencies so that the total effect is greater than the sum of the parts

T

target

A statement used to express planned results to be reached within a stated time period

terracing

A treatment used to prepare steep slopes (20 to 60 percent) for reforestation. Tractors are used to cut terraces (benches) along the contour of the slope to remove competing vegetation and/or expose mineral soil. Terraces are normally 8 to 12 feet wide with an undisturbed area left between the terraces. One to two rows of trees, spaced 6 to 10 feet apart, are then planted on each terrace

theoretical maximum capacity (TMC)

Formula used for planning purposes that captures a percentage of the design capacity* of a recreation facility

$$TMC = PAOT \times \text{managed season days} \times 2 \times 40\%$$

Where PAOT = people-at-one-time

Managed season days = number of days that a facility is open for use

2 = two 12 hour recreation visitor days/use days

40% = estimated percent of time the site is utilized by a visitor in a 24 hour period

* Design capacity The number of PAOT which the space or facility can safely and conveniently support, consistent with the level of recreation experience (degree of site development) the site is intended to provide.

thermal cover

Trees of sufficient density that provide shelter from adverse temperature conditions for wildlife

thinning

Cutting made in an immature crop or stand in order primarily to maintain or accelerate the diameter increment (annual growth) of the residual trees but also, by suitable selection, to improve the average form of the trees that remain, without permanently breaking the canopy

threatened, endangered, and sensitive species (TE&S)

See separate listing

threatened species

Any species which is likely to become an endangered species within the foreseeable future and which has been designated as threatened in the Federal Register

threshold of concern (TOC)

The point which a physiological or psychological effect begins

threshold level

The minimum concentration or amount of a given substance or condition necessary to produce a measurable physiological or psychological effect

timber harvest schedule

The quantity of timber planned for sale and harvest, by time period, from the area of land covered by a Forest Plan. The first period, usually a decade, of the selected harvest schedule provides the allowable sale quantity. Future periods are shown to establish that sustained yield will be achieved and maintained.

timber management intensities**intensive**

A category of timber management intensity characterized by optimum timber yields (80-100 percent of potential) using the full range of silvicultural practices and intensities to obtain these yields. Average rotation lengths vary from 100 to 110 years. Other non-timber objectives do not substantially constrain timber outputs. Examples of land included in this category are Commercial Wood Products Emphasis/Timber Management (Prescription VIII)

minimal

A category of timber management intensity characterized by minor yields (20 percent of potential), primarily from sanitation/salvage cutting, due to site limitations or resource objectives which severely restrict timber management. Average rotation length is 200 years.

modified

A category of timber management intensity characterized by reduced yields (70 to 80 percent of potential) due to limitations on silvicultural practices or intensities in order to meet other resource objectives. Average rotation length is 125 years. Examples of land included in this category are Wildlife Habitat Management (Prescription VI) and visual partial retention areas of Roaded Recreation (Prescription III)

timber production

The purposeful growing, tending, harvesting, and regeneration of regulated crops of trees to be cut into logs, bolts or other round sections for industrial or consumer use. The term does not include firewood.

timber stand improvement (TSI)

The use of pre-commercial thinning, cleaning, weeding and intermediate cuttings to eliminate or suppress less desirable vegetation and improve composition, condition, structure, or growth of a stand.

timber suitability

Suitable Forest land that is to be managed for timber production on a regulated basis in an alternative

Tentatively Suitable. Forest land that (1) is producing or is capable of producing crops of industrial wood, (2) has not been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service, (3) has existing technology and knowledge to ensure timber production without irreversible damage to soils, productivity, or watershed conditions, (4) has existing technology to ensure adequate restocking can be attained within 5 years after final harvest, and (5) has adequate information available to project responses to timber management activities.

Unsuitable (Not Suited) Forest land that is not managed for timber production because (1) the land has been withdrawn by Congress, the Secretary of Agriculture, or the Chief of the Forest Service, (2) the land is not producing or capable of producing crops of industrial wood, (3) technology is not available to prevent irreversible damage to soils, productivity, or watershed conditions, (4) there is no reasonable assurance that lands can be adequately restocked within 5 years after final harvest, based on existing technology and knowledge, as reflected in current research and experience, (5) there is at present a lack of adequate information in response to timber management activities, or (6) timber management is inconsistent with or not cost efficient in meeting the management requirements and multiple-use objectives specified in the Forest Plan.

tradeoff

The impact on an output or cost produced by changing another output or cost.

transportation network

The transportation network includes all existing and planned roads, trails, bridges, airfields, and other transport facilities wholly or partly within or adjacent to and serving the planning area.

travel influence zone

Areas comprising existing or anticipated significant public outdoor recreational occupancy use along existing and planned overland routes of travel, areas in and around existing or planned developed recreation sites. These are areas in which beauty of the landscape and other aesthetic values are key management considerations.

Trinity Divide Biolink

A link for biologic elements (animals, plants and people) joining the Klamath and South Cascade physiographic provinces.

type conversion

The conversion of one type of vegetation cover to another, e.g., the conversion of brush or forest covered lands to grass as for grazing purposes

U

unacceptable modification

Activities that contrast excessively in form, line, color or texture from the characteristic landscape

underburning

The prescribed use of fire beneath a forest canopy

understory

The lower layer of trees and shrubs under the forest canopy

uneven-aged timber management

A timber management practice in which the application of a combination of actions needed to maintain continuous high-forest cover, recurring regeneration of desirable species, and the growth and development of trees through a range of diameter or age classes, provides a sustained yield of forest products. Cutting is usually regulated by specifying the number or proportion of trees of particular sizes to retain within each area, thereby maintaining a planned distribution of sizes classes. Cutting methods that develop and maintain uneven-aged stands are single-tree selection and group selection. See also Appendix L in the Forest Plan for definition.

unnoticed

See "visual condition"

unplanned ignition

A fire started at random by either natural or human causes, or a deliberate incendiary fire

untouched

See "visual condition"

V

values-at-risk

Any resources that are at risk of being damaged/destroyed as a result of fire

values, market

Values for market goods and services in terms of what people are willing-to-pay as evidenced by market transactions - measured in real dollars

values, non-market

Values for non-market goods and services that must be imputed from other economic information

vanity class

A classification system with three landscape categories

Distinctive (Class A) Unusual and/or outstanding landscape variety that stands out from the common features in the landscape

Common (Class B) Prevalent, usual, or widespread landscape variety within a character type. It also refers to ordinary or undistinguished visual variety

Minimal (Class C) Little or no visual variety in the landscape, monotonous or below average compared to the common features in the character type

vegetative pattern

A vegetative arrangement of parts, elements, or details that suggests a design of somewhat orderly distribution

viewshed

Landscape seen or potentially seen from all or a logical part of a travel route, use area, or water body. The purpose of corridor viewshed planning is to provide the management direction for retaining or creating the desired forest character in an attractive sequential arrangement over time and space.

visual absorption capability (VAC)

Capacity of a landscape to absorb proposed development or management activities and still maintain its inherent visual character and quality. Two of the most important factors affecting the absorption capability of a landscape are (1) the degree of visual penetration, i.e., the distance into the landscape you can see from a vantage point, and (2) the complexity of the landscape

visual character

The overall impression created by a landscape's unique combination of visual features (such as land, vegetation, water, structures, etc.)

visual condition

The degree of physical alteration to the landscape. Visual condition is referred to as existing visual condition (EVC) or future visual condition (FVC). Visual condition of activities is measured by size, shape, and contrast in vegetative density. For example, an irregularly shaped management activity located in a densely canopied conifer stand which has removed most vegetation in a one to five acre area would be classified as visual condition class II.

This method of measurement is used to characterize the present quantity and degree of physical alteration, future quantity and degree of physical alteration, and the rate of change in those conditions that will occur over time in any alternative form of management

Visual Condition Classes are as follows

Class I - Untouched Areas that appear to have no physical alteration

Class II - Unnoticed Areas can be any size with low contrast or very small (0-5 acres) with high contrast

Class III - Minor disturbances Areas over 40 acres with moderate contrast to very small areas (0-5 acres) with very high contrast

Class IV - Disturbed. Very large areas (40+ acres) of high contrast to small areas (5-10 acres) of very high contrast

Class V - Major disturbance Very large areas of very high contrast to large (20-40 acres) areas of high contrast

Class VI - Drastic disturbance Areas greater than 300 acres of high contrast

visual quality index (VQI)

A numerical rating of scenic quality, an indicator of the relative overall visual quality of the forests. Each acre of land is assigned a point value (ranking) based upon the visual quality level and the landscape variety class. Rankings range from a high of ten points for an acre of land managed to a preservation standard on variety class A lands, to no points for unacceptable modification on variety class C lands. Specific methodology for determining VQIs can be found in the Forest Planning Records

visual quality objective (VQO)

A set of measurable maximum levels of apparent naturalness of an area based on physical and sociological characteristics. Refers to degree of acceptable alteration of a characteristic landscape

Preservation Ecological change only

Retention Human activities are not evident to the casual forest visitor

Partial Retention Human activity may be evident but must remain subordinate to the characteristic landscape

Modification Human activity may dominate the characteristic landscape but must, at the same time, follow naturally established form, line, color, and texture. It

should appear as a natural occurrence when viewed in foreground or middleground

Maximum Modification Human activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background

W

warmwater fishery

Stream and lake waters which support fish with a maximum summer water temperature tolerance of about 80 degrees Fahrenheit. Bluegills, perch, and largemouth bass are examples

matchable wildlife

Wildlife that people enjoy viewing such as deer and bald eagles

waterform

The shape or visual structure of a body of water

water influence zone

Areas oriented to outdoor water recreation

Watershed condition class

A description of the health of a watershed, or portion of the watershed, in terms of the factors which affect the quality, quantity and discharge characteristics of surface and groundwater resources, and the capacity of a soil for producing a plant community or sequence of communities under a specified system of management. See Appendix H for detailed descriptions of Class 1, 2, and 3 watersheds. Briefly, they are

Class 1 Watersheds which are generally in good to excellent condition

Class 2 Watersheds which are generally in fair to good condition

Class 3 Watersheds which are generally in poor to good condition

watershed order (first, second, third, fourth, or fifth)

Location of a watershed relative to its tributaries, corresponding to stream order

Wetlands

An area at least periodically wet or flooded, where the water table stands at or above the land surface (wet meadows and marshes)

wilderness attribute rating system (WAFS)

An index of wilderness quality used in the second Roadless Area Review and Evaluation (RARE II) of 1977

Chapter VIII - Glossary

The rating consists of four requisite attributes: 1) natural integrity, 2) apparent naturalness, 3) outstanding opportunities for solitude, and 4) primitive recreation opportunities. In addition, the system provides for rating supplemental wilderness attributes: outstanding ecological, geological, scenic, and historical features.

wildlife user day (WUD)

A WUD represents a person being involved in the pursuit, taking or enjoyment of wildlife for a period of 12 hours.

wildlife habitat relationship (WHR)

A system of organizing information about wildlife, their habitats, and relationships between them, the land and resource management. It is used to set standards and

guidelines, to evaluate species and habitat diversity, and to identify special habitat needs, etc.

wild river

Wild and Scenic River **Act** usage: Those rivers or sections of rivers that are free of impoundments, with shorelines essentially primitive, generally inaccessible except by trail, and with unpolluted water.

X

xeric

Habitat characterized by dry conditions rather than mesic (moderate) or hygric (wet) conditions. Chaparral is an example.

Chapter 1

Index

CHAPTER IX

Index

A	
Air Quality	11-34, 11-46, 11-57, 11-68, III-13, IV-6
Adaptive Management Area	11-45
Administratively Withdrawn Areas	11-45
Affected Environment	Chapter III
Allowable Sale Quantity (ASQ)	I-10, 11-43, II-53, II-65, 11-83, IV-51 to 53, Chapter II
Alternative(s) Chapter	
Benchmarks	11-5
CBF - Citizens for Better Forestry	11-68
Common Direction	11-20
Comparison of	11-86
CUR - No Action/No Change	11-57
Development Process	II-1
Eliminated	II-14
PRF - Preferred	11-34
RPA - 1980 RPA Program Emphasis	11-46
Anadromous	III-33, IV-18
Analysis Area	B-3
Analysis Process	App B
Animal Months	111-63, IV-35
Archaeological Resources	1-8, III-52, 7, 11-34, 11-86
Arterial	III-26, IV-15
B	
Backbone Roadless Area	App C, III-112
Bald Eagles	III-125, IV-75
Bear Creek Candidate RNA	111-77, IV-42, App F
Bell Quinby B Roadless Area	App C, III-112
Benchmark	II-5, App B
Benefit - Cost Analysis	II-106, App B
Biological Diversity	I-8, III-13, IV-8
Biomass	111-22, IV-13
Black Bears	III-114, III-116
Bonanza King Roadless Area	App C, III-112
Botany	III-24, IV-14
Budget	II-106
Bull Trout	III-39
C	
Canyon Creek	App E, III-107, IV-65
Capability Areas	II-2, 8-3
Cascade Candidate RNA	App F, III-77
Cash Flow	App B, II-106, IV-42
Castle Crags Roadless Area	App C, III-112
Castle Crags Wilderness	III-108
Cedar Basin Candidate RNA	App F, III-77, IV-42
Chancelulla	App C, III-112
Roadless Area	App C, III-108, IV-67
Chaparral	III-18, IV-10
China Springs B Roadless Area	App C, III-112
Chinquapin Roadless Area	App C, III-112
Clearcutting	1-10, III-87, IV-49, App J
Collector	III-26, IV-15
Community Stability	1-9
Congressionally Reserved Areas	11-45
Constraints	App B
costs	II-106, App B
Cow Creek Roadless Area	App C, III-112
Cultural Resources	III-52, IV-27
Cumulative Watershed Impacts	III-99
D	
Data Base	App B
Deep Crater SIA	111-79, IV-44
Devils Rock Roadless Area	App C, III-112
Devils Rock - Hosselkus Candidate RNA	App C, III-77, IV-42
Diversity	III-15, IV-8
Dog Creek Roadless Area	App C, III-112

Chapter IX - Index

<hr/>		H	
Eagle Roadless Area	App C, III-112	Habitat	III-15, 111-32, III-113, IV-8, IV-18, IV-70
East Beegum Roadless Area	App C, III-112	Hardwoods	III-115, III-118, IV-10, IV-70
East Fork Roadless Area	App C, III-112	Hayfork Creek	App E, III-107, IV-65
East Girard Roadless Area	App C, III-112	Herbicides	I-10, III-86, IV-50
Economic	App B, III-1, IV-1	Hiking/Backpacking	III-68
Analysis	App B, II-106	Historical Resources	III-52, IV-27
Consequences	II-106	Human/Community Development	III-8, IV-3
Effects	II-106	Hydroelectric	III-57, IV-30
Efficiency	App B	<hr/>	
Environment	III-1, IV-1	I	
Endangered Species	111-121, IV-75	Income	II-106, III-1, IV-1
Energy	IV-78	Indicator Species	App G, 111-122, IV-70
Environment	Chapter III, Chapter IV	Integrated Pest Management (IPM)	III-45, IV-24
Affected	Chapter III	Irreversible/Irretrievable Effects	IV-77
Consequences	Chapter IV	Issues	1-8
To be Created	Chapter II	<hr/>	
Even-aged	III-87, IV-49, Appendix J	K	
<hr/>		<hr/>	
F		Kettle Mountain Roadless Area	App C, III-112
Facilities	III-26, IV-15	<hr/>	
Fire and Fuels	III-30, IV-16	L	
Fish	I-8, III-32, IV-18	Lands	III-55
fisher	See T&E Sensitive Species	Late-Successional Reserve	11-45, IV-29
fisher Gulch Roadless Area	App C, III-112	Law Enforcement	III-58, IV-32
Forest Pests	III-45, IV-24	List of Preparers	Chapter V
FORPLAN	App B	Little French Creek Roadless Area	App C, III-112
Further Planning Areas	App C, III-108, IV-67	Little Glass Mountain SIA	III-79, IV-44
<hr/>		Local Economy	III-1, IV-1
G		Local Road	III-26, IV-15
Geology	III-48, IV-26	<hr/>	
Geothermal	III-61, IV-33	M	
Glossary	Chapter VIII	Management Direction	Chapter 2
Giant Crater Lava Tube SIA	111-79, IV-44	Management Indicator Species (MIS)	App G
Goshawk	III-126, IV-75	Management Prescriptions	11-24
Gray Squirrel	III-114	Management Requirements (FMRs)	11-23
Grazing	111-63, IV-35	Manzanita Creek Candidate RNA	App F, 111-77
Group Selection	App J	Matrix	11-45
Guidelines	11-23	McCloud River	App E, III-107, IV-65

Minerals	III-59, IV-33	Pattison Roadless Area	App C, III-112
Minimum Implementation Requirements (MIRs)	11-21	Peregrine Falcon	111-125, IV-75
Minimum Management Requirements (MMRs)	II-20	Penny Ridge RA	App C, III-112
Mitigation	IV-76	Pests/Pesticides	111-45, IV-24
Monitoring	Chapter V (Forest Plan)	Pine Marten	111-126, IV-75
Mt Eddy	1-10	Plants	III-29, IV-14
Further Planning Area	App C, III-109	Preacher Meadows Candidate RNA	App III-77
Candidate RNA	App F, III-77	Prescribed Burning	1-8, III-15, III-30, IV-8, IV-16
Mt Shasta	1-11	Present Net Value (PNV)	App B, II-106
B Roadless Area	App C, III-112	Preservation	III-95, IV-55
Special Management Area	111-67	Public Comment/Concerns	App K, Chapter I
Wilderness	III-108	Pumice Stone Mountain Candidate RNA	App F, 111-77
Mule Deer	III-116	Purpose and Need	I-1
Murphy Glade			
Candidate RNA	App F, III-77		
Roadless Area	App C, III-112		
N		R	
National Environmental Policy Act (NEPA)	1-2	Rainbow Trout	III-41
National Forest Management Act (NFMA)	I-1	Range	III-63, IV-35
National Natural Historic Landmark	111-62	Receipts to Counties	III-3, IV-2
National Recreation Area	III-68	Recreation	
National Recreation Trails	III-28	Developed	111-67, IV-36
Natural Bridge SIA	111-79, IV-44	Dispersed	III-68, IV-36
New River	III-107	Opportunity Spectrum	III-67, IV-36
O		Redband Trout	III-40
Off-Highway Vehicles (OHV)	I-9, 111-66, IV-36	Red Butte-Red Fir Ridge Candidate RNA	App F, III-77
Outputs	Chapter II	Reforestation	I-10, 111-86, IV-49
P		Research Natural Areas (RNAs)	I-9, App F, 111-76, IV-41
Pacific Crest National Scenic Trail	111-68	Resource Environment	III-13
Paint Pot Crater SIA	111-79, IV-44	Retention	III-95, IV-55
Panther Roadless Area	App C, III-112	Riparian Areas	I-9, III-71, IV-39
Partial Retention	111-95, IV-55	Riparian Reserves	11-45, 11-38
		Reads	I-8, III-26, IV-15
		Roadless Areas	I-10, III-108, IV-67
		ROS (Recreation Opportunity Spectrum)	III-67, IV-36
		Rough Gulch Candidate RNA	App F, 111-77
		PA	11-46
		Rural Recreation	III-67

		T
Sacramento River	App E, III-107	Tedoc Mountain SIA 111-79, IV-44
Salt Gulch Roadless Area	App C, III-112	Threatened Endangered and Sensitive Species III-123 IV-22, IV-75
Samwel Cave SIA	111-79, IV-44	Threshold of Concern (TOC) App H, III-99, IV-62
Scenic River	III-107, IV-104	Timber
Scenic Roads	III-94, IV-54	Even-aged App J, III-87, IV-49
Scoping Process	Chapter I	Harvest Level Chapter II, IV-48, 111-86
Seed Tree	App J	Reforestation/Regeneration III-86, IV-49
Selection Logging	App J	Sustainability III-90, IV-47
Semi-Primitive Motorized	111-67	Supply/Demand III-91
Semi-Primitive Non-Motorized	III-67	Uneven-aged App J
Sensitive Species	III-126, IV-75	Trails 111-28
Seral Stages	III-20, 111-16, IV-10, IV-70	Transportation III-26, IV-15
Shasta Unit NRA	111-68	Trinity
Shasta Mud Flow RNA	111-76, IV-41	Alps Wilderness III-109
Sheltonwood	App J	River App E, III-107
Silvicultural Systems	App J	Unit NRA III-68
Single Tree Selection	App J	
Sisson Callahan National Recreation Trail (NRT)	111-28	
Site Preparation	III-96, IV-49	
Skiing	III-66, IV-36	
Slate Creek Roadless Area	App C, III-112	
Smoky Creek Candidate RNA	App F, III-77	
Social Environment	111-8, IV-3	
Soils	111-74, IV-40	
South Fork Mountain Candidate RNA	App F, III-77	
South Fork Roadless Area	App C, III-112	
South Fork Trinity NRT	III-28	
Spatter Cones SIA	III-79, IV-44	
Special Interest Area (SIAs)	I-9, III-79, IV-42	
Special Uses	111-56, IV-29	
Spotted Owls	111-123, IV-75	
Squaw Valley Creek W&SR	App E, III-107, IV-65	
Standards and Guidelines	11-23	
Steelhead Trout	III-37, IV-23	
Stuart Fork Candidate RNA	App F, 111-77	
Suitable Forest Lands	III-90, IV-47	
		U
		Unacceptable Modification III-95
		Undisturbed Roadless Area App C, III-112
		Uneven-Aged Timber Management App J, 111-87
		V
		Vegetation III-15, III-24, IV-8, IV-14
		Virgin Creek App E, III-107
		Visual Quality III-94, IV-54
		Condition III-94, IV-54
		Index (VQI) III-94, IV-54
		Objectives (VQOs) III-95, IV-54
		W
		Water III-98, IV-59
		Wells Mountain Roadless Area App C, III-112
		West Beegum Roadless Area App C, III-112

West Girard Roadless Area	App C, III-112	Winter Sports	11166
Wild and Scenic River	App E, III-104, IV-64		
Wilderness and Roadless Areas	III-108, IV-67, App C	Y	
Wildlife	III-113, IV-70, App G		
Withdrawals	III-56, III-61, IV-30, IV-33	Yolla-Bolly Middle Eel Wilderness	III-109

Appendix A

Issues, Concerns, and Opportunities

APPENDIX A

Issues, Concerns, and Opportunities

Identification Process

Scoping Process (Identifying Public Issues)

In October 1979, the Forest Supervisor of the Shasta-Trinity National Forests initiated a public participation plan for the Forests' long-range planning process. Public participation for the Proposed Forest Land and Resource Management Plan (proposed Forest Plan) began with the publication of a Notice of Intent in the Federal Register on October 25, 1979.

On November 1, 1979, County Boards of Supervisors, the State Clearing House, and tribal leaders of local Native Americans were notified by letter about the Forests' planning process and the schedule of anticipated planning actions. At the same time, a news release was sent to newspapers and radio and television stations within the Forests' zone of influence.

A contact plan, identifying government officials and Native American tribal leaders affected by the Shasta-Trinity National Forests' planning process, was also prepared. In the contact plan, District Rangers and interdisciplinary team members were assigned responsibilities to brief their designated contacts, on a one-to-one basis, and to encourage their participation in the planning process. This contact plan is included in the planning records at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, CA.

A preliminary mailing list was developed from previous public involvement efforts. This list, computerized for easy updating, contained the names and addresses of individuals, organizations, government agencies and Native American tribal leaders. It now contains about 700 names.

An initial planning newsletter, describing the planning process and inviting public participation in the identification of issues, was sent to everyone on the mailing list in December, 1979. In addition, posters (with return postcards), encouraging public participation, were placed in offices and stores throughout the Forests' zone of influence.

Paid advertisements appeared in four local newspapers during November, 1979, announcing public workshops in Burney, Mt Shasta, Redding, and Weaverville. The workshop in Burney was co-hosted by the Lassen National Forest, and the Weaverville Ranger District workshop was co-hosted with the Mendocino National Forest. On November 20, 1979, a news release was circulated to the news media inviting the public to attend the November/December workshops.

As a result of the Forests' initial public participation effort, 330 written responses, containing some 2,000 comments, were received.

Screening of Suggested Issues

The first step in analyzing the public responses was to sort and classify the comments. In this step, comments of a general nature were separated from "public issues." By definition, a public issue is a subject or question of widespread public interest relating to the management of National Forest lands.

Many of the public's general comments pertained to the Forest Service's land management process and various day-to-day operational matters, rather than controversies about speck resource and management plans.

The next step was to screen the public issues by applying the four criteria described below. This screening was necessary to ensure that the proposed Forest Plan focuses directly on major public issues which will determine future uses of Shasta-Trinity National Forests' land and resources. (It should be noted that the proposed Forest Plan does not focus on broad national economic or social concerns, day-to-day operational decisions, or on matters beyond the scope, responsibility, and authority of the Forest Supervisor.) Each proposed issue was screened against four criteria. If a "yes" could be answered to all the criterion-questions, it became a major public issue. If the answer to any one criterion was no, the issue was screened "out" and did not become a major public issue.

Screening Criterion No. 1: LONG-RANGE versus SHORT-RANGE Does the proposed issue involve major, long-range, land-use planning decisions ("strategic")

decisions), as distinguished from short-range "operational" activities and decisions?

Screening Criterion No. 2 PLANNING LEVEL Can the proposed issue be addressed at the Forest "level" within the planning process prescribed in the Planning Regulations and Federal legislation such as the National Environmental Policy Act (NEPA) and the Forest and Rangeland Renewable Resources Planning Act of 1980 (RPA)?

Screening Criterion No. 3 AUTHORITY Is the proposed issue within the Forests' scope of direct responsibilities and authorities?

Screening Criterion No. 4 PUBLIC INTEREST Is the proposed public issue a subject or matter of widespread public interest, relating to the management of National Forest lands, identified through public participation?

Of the 111 issues which were screened, 25 met all of the criteria. Subsequently, they were addressed as "major public issues" in the 1986 Forest planning documents.

Screening of Management Concerns

National Forest Management Act (NFMA) regulations require that the Forest Supervisor determine the management concerns that are to be addressed in the planning process. Proposed management concerns were derived from the following sources:

1. References spread throughout the NFMA regulations which relate to specific resources, activities, and concerns.
2. Management concerns recommended by Forest personnel. Similar to the analysis of public issues, these items were sorted by applying the regulations' definition: "A management concern (is) an issue, problem, or condition which constrains management practices identified by the Forest Service in the Planning process." Following this sort, the proposed management concerns were screened against three criteria given in the Forest Service Manual (FSM 1920):
 - a. Those that do not involve long-range planning and that are usually addressed at the project level (this corresponds to Screening Criterion # 1 for major public issues).
 - b. Those that cannot appropriately be addressed at the National Forest level (corresponds to Criterion #2 for major public issues).
 - c. Those that do not involve the Forest Service (corresponds to Criterion #3 for major public issues).

- c. Those that do not involve the Forest Service (corresponds to Criterion #3 for major public issues).

Those items which were screened "in" were placed under the appropriate RPA program element to accompany major public issues as "related management concerns."

Public Issues/Management Concerns Document

In a letter dated May 23, 1980, everyone on the Forests' planning mailing list was notified which public issues were selected to be addressed in the proposed Forest Plan. The letter also referred to a detailed report of the issue/identification process that was available for review. Copies of this document are in the official planning records at the Forest Supervisor's Office, 2400 Washington Avenue, Redding, California.

The letter also announced that open houses would be held in June in Hayfork, Mt. Shasta, Redding, and Weaverville to answer questions about the proposed Forest Plan and the disposition of public comments. Very few people attended these open houses.

Information meetings were also held in Mt. Shasta, Redding, and Weaverville during December, 1980.

In 1983 an extensive public involvement effort was undertaken with regard to roadless areas. This process focused specifically on the roadless areas recommended for wilderness, non-wilderness, and further planning in the 1979 Roadless Area Review and Evaluation (RARE II) Environmental Impact Statement (EIS). A detailed description of this effort is on file in the official planning records at the headquarters of the Shasta-Trinity in Redding.

Since the Forest planning process began, a coordinated planning approach has taken place with local, State, and Federal agencies. National Forests in Northern California and Southern Oregon and the Regional Office in San Francisco.

A progress report on the status of the proposed Forest Plan has been displayed regularly in the semi-annual (April and November publication of the forest Environment Assessment [EA] Status Report). About 150 of these publications are sent to elected officials, government agencies, organizations and individuals.

Land Management Planning Documents (1986)

In August, 1986, the Shasta-Trinity National Forests issued two land management planning documents for public review and comment. Nearly 1,000 copies of the Proposed Forest Land and Resource Management Plan (proposed Forest Plan) and the Draft Environmental Impact Statement (DEIS) were sent to interested publics along with a transmittal letter. Another 400 documents were mailed upon request during the public review period. In addition, a news release was sent to the news media within the Shasta-Trinity National Forests' zone of influence outlining the public review process and encouraging public participation.

The initial 90-day public review period began with the issuance of the proposed Forest Plan and Draft EIS on August 17, 1986. Public briefings were held between August 25th and September 4th in Burney, Hayfork, McCloud, Mt. Shasta, Red Bluff, Redding, and Weaverville.

Reaction to the documents was mixed. Some wanted the documents to be withdrawn and others asked that the public comment period be extended. Because of the implications of some of the concerns raised, Regional Forester Zane G. Smith announced on September 26, 1986, that the draft documents were being recalled and would be re-issued at a later date. However, he encouraged public comments by emphasizing that they would be extremely helpful in rewriting the proposed Forest Plan and Draft EIS. Shortly after Smith's announcement, the public review date was extended to January 17, 1987.

During December, 1987, eight (afternoon and evening) formal hearings were held at Redding (12/8), Hayfork (12/9), Weaverville (12/10), and Mt. Shasta (12/11). A total of 163 people gave statements at the hearings.

By the close of the public review period, the Shasta-Trinity National Forests had received more than 1,300 pieces of correspondence containing a wide variety of valuable information. Comments came in the form of postcards, letters, form letters, petitions, resolutions, and 100 page documents as in the case of a Citizen's for Better Forestry Alternative and a Wilderness Society Critique. Transcripts from the public hearings were analyzed the same as the other correspondence received.

A summary of the content analysis process (the method used to analyze the public comments received) was made available to the public in May, 1987.

Comments received during the 1986/87 public review period were used to update and revise the public issues for the 1990 phase of Forest planning. Management concerns were either dropped or elevated to public issues. Thirty major public issues were addressed in Chapter I of the 1990 Draft EIS. For a detailed list and description of those issues refer to that document.

Revision Of Land Management Planning Documents (1987-1990)

From the close of the public comment period (January, 1987) through the re-issuance of the revised planning documents, emphasis was placed on providing the public with a better understanding of some of the major areas of controversy. This was done primarily through a series of public seminars.

4 March, 1987, seminar covered the content and capability of the new planning data base for the Forest. Also presented was information on the revised planning schedule and an overview of the public comments received on the Draft EIS and proposed Forest Plan. A seminar held in May, 1987, addressed the various silvicultural systems, including alternatives to clearcutting. A preliminary analysis of the amount of timber that could be produced by adopting any of the silvicultural systems was also presented.

At the July, 1987 seminar, spotted owls and some options for managing their habitat was discussed. A September, 1987 seminar covered how the management of the natural resources, employment, revenues, and Forest Service budgets fit together in the development of a Forest plan. An early Fall, 1988 seminar focused on the formation of alternative Forest plans.

Throughout the planning period, Forest Service personnel worked closely with individuals and groups to give them a better understanding of the forest planning process. Some of the groups included The Audubon Society, Sierra Club, SHARE (Shasta Alliance for Resources and Environment), CBF (Citizens for Better Forestry), California Native Plant Society and The Wilderness Society.

The Citizens for Better Forestry developed and proposed an alternative Forest Plan in December of 1986. Represent-

The Citizens for Better Forestry developed and proposed an alternative Forest Plan in December of 1986. Representatives from CBF worked closely with Forest Service planners to refine their proposal so it could be evaluated along with other alternatives in the Draft EIS. The CBF proposal was displayed as Alternative CBF.

In addition, the Trinity County Board of Supervisor; submitted comprehensive suggestions that applied to portions of Trinity County. Although those suggestions were not treated as a separate, new alternative, many of them were analyzed in detail and brought forward into one or more of the alternatives.

A few "round table" sessions, sponsored by the University of California Cooperative Extension Forester, were held in Mt. Shasta and Weaverville. The purposes of those sessions were to provide a public forum to share ideas and gain a better understanding of the Forests' planning process.

Since the decision was made to revise and re-issue the documents, informational programs were also presented to various groups such as Shasta County School Administrators, Rotary Clubs, American Society of Civil Engineers, Miner's Committee, California Registered Professional Foresters and The Shasta Fly Fishers.

Land Management Planning Documents (1990 - 1993)

On February 27, 1990, the Shasta-Trinity National Forests issued a Draft EIS and proposed Forest Plan for a 120-day period of public review and comment. At that same time, a news release was distributed to the news media within the Shasta-Trinity National Forests' zone of influence outlining the public review process and encouraging public participation.

Public briefings on the contents of the two documents were held in Redding, Weaverville and Mt. Shasta during April of 1990.

Formal Public Hearings on the two documents were held in June of 1990 in Redding, Weaverville and Mt. Shasta.

On June 22, 1990, during the public review period, the U.S. Fish and Wildlife Service listed the northern spotted owl as a threatened species under the Endangered Species Act. That action significantly changed the range of management opportunities displayed in the Draft EIS and

proposed Forest Plan. The Forest Supervisor subsequently announced that revised documents would be issued. The revised documents would provide the public with an opportunity to review and comment on the full disclosure of the effects of the listing of the spotted owl. Public comments were encouraged and continued to be received until the comment period closed on July 7, 1990.

By the end of the public comment period, 1,656 responses were received and their contents analyzed. Subsequently, the 30 public issues addressed in the Draft EIS were re-evaluated. Some of the public issues did not warrant further consideration, they were either dropped or combined with other issues. The list was narrowed down to 21 public issues that are addressed in the Draft EIS and the accompanying proposed Forest Plan.

A January 22, 1991, Notice of Intent was published in the Federal Register announcing that the Forest Service would issue a revised Draft EIS and proposed Forest Plan during the Winter, 1991-92.

On January 28, 1991, a letter was sent to everyone on the planning mailing list updating them on the status of the proposed Forest Plan.

Another Notice of Intent was published in the December 4, 1992, Federal Register changing the date for issuing the revised documents to Spring, 1993.

In October of 1993 the DEIS and proposed Forest Plan were issued. Over 400 responses were received. Based on public response the number of issues to be addressed in the FEIS was increased to 22.

Review of Other Agency/Native American Tribal Plans

U.S. Department of Interior-Bureau of Land Management (BLM)

Resource Management Plan - Redding Resource Area

Forest personnel participated in the review of the resource situation analysis involved in the preparation of the above plan. This provided the Shasta-Trinity with an opportunity to ensure that the management directions prescribed on adjacent National Forest lands in the Draft

U.S. Department of Interior-Bureau of Indian Affairs (BIA)

Klamath River Basin Fisheries Resource Plan

This plan was used in the development of the analysis of the management situation for the fishery resource. This plan was used to establish management opportunities for habitat improvement, to gather histories of past anadromous fish runs, to determine current and projected estimates of angler demands and use patterns, and to describe current habitat conditions.

U.S. Department of Interior-Bureau of Reclamation

Proposed Trinity River Basin Fish and Wildlife Management Program (October, 1980)

This plan was used to develop background information and histories of past fish runs for the analysis of the management situation for the fishery resource.

U.S. Department of Interior-Fish and Wildlife Service

Final Environmental Impact Statement (Final EIS) - Proposed Trinity River Basin Fish and Wildlife Management Program

This Final EIS was used to establish fishery habitat improvement opportunities and feasible production goals for the Trinity River Basin fishery.

U.S. Department of Interior-National Park Service

Whiskeytown-Shasta-Trinity National Recreation Area (NRA) - Whiskeytown Unit Master Plan

This Plan was used to coordinate recreation management between the Forest Service and the National Park Service

units of the NRA. The resulting management direction was incorporated into the supplemental management direction for the Management Areas comprising the Shasta and Trinity Units of the NRA. Refer to Chapter 4 of the Forest Plan.

State of California - Department of Fish and Game (DFG).

- Hayfork Deer Herd Management Plan**
- McCloud Flats Deer Herd Management Plan**
- Weaverville Deer Herd Management Plan**
- Yolla Bolla Deer Herd Management Plan**

These plans were used to incorporate some of the wildlife goals and objectives in the proposed Forest Plan. They were used to establish projected levels of hunting use, and to evaluate and describe current and projected population conditions for game species for the analysis of the management situation.

Shasta, Tehama, Siskiyou, and Trinity Counties

General Plan(s)

These plans were used to ensure maximum compatibility of direction on Shasta-Trinity National Forests lands with adjacent private landowners. Close review of the Shasta County General Plan was made with respect to private land uses allowed within the Shasta Unit of the NRA and recreational subdivisions adjacent to National Forest lands elsewhere on the Forests. These plans had broad implications on land ownership direction shown as supplemental direction under each of the 22 Management Areas identified in the Forest Plan.

Appendix B

The Modeling and Analysis Process

APPENDIX B

The Modeling and Analysis Process

I. Introduction

The purpose of this Appendix is to present a technical discussion of the analysis process and models used in Forest planning. Basic assumptions, model components and inputs, modeling rules and methods, and modeling constraints imposed, along with their rationale and impacts, are described in this Appendix. Information presented here supplements the broader and less technical descriptions that are included elsewhere in this Final Environmental Impact Statement (FEIS). See Chapter II for a description of the overall process, the results of the benchmark analysis, additional discussion of the alternatives, and a discussion of opportunity costs associated with Forest constraints.

FORPLAN, a linear programming model, is the primary modeling tool used to assure that land allocations and output schedules are made in a way that meets all constraints in the most cost-efficient manner possible. In addition to being used to formulate alternatives and benchmark, FORPLAN is used to perform detailed accounting work and to generate summary reports of information needed to construct the display tables in this FEIS.

Four additional models were used to generate input data for use in FORPLAN, to interpret output data from FORPLAN, and to assist in the spatial allocation of FORPLAN to meet various alternative themes:

- A Forest Plan Data Base was developed to define land units (i.e. analysis areas) and acres of suitable prescriptions by alternative.
- A Geographic Information System (GIS) used the Forest Plan Data Base to visually display timber suitability which, in turn, was used in the mapping and development of the Forests' alternatives.
- A Wildlife and Fish Habitat Relationships system (WFHR) was used to model and analyze the alternative's effects on forest habitats.
- The Effective Alteration (EFFALT) modeling employed perspective plot computer simulations to correlate levels of timber harvesting with visual quality objectives.

(VQOs) More detailed descriptions of these models appear in Section III of this Appendix.

II. The Forest Planning Model

A. Overview

FORPLAN is a specialized matrix generator and report writer for a standard linear programming algorithm, the Functional Mathematical Programming System (FMPS). This is the linear programming code used with PC FORPLAN. Linear programming is a standard mathematical technique for solving simultaneous linear equations subject to a certain set of constraints and a particular objective function. In its simplest form, this is expressed mathematically as:

$$\text{Maximize } z = c_1x_1 + c_2x_2 + \dots + c_nx_n$$

(Objective function)

$$\text{Subject to } a_{11}x_1 + a_{12}x_2 + \dots + a_{1n}x_n \leq b_1$$

$$a_{21}x_1 + a_{22}x_2 + \dots + a_{2n}x_n \geq b_2 \text{ (Constraint set)}$$

$$a_{m1}x_1 + a_{m2}x_2 + \dots + a_{mn}x_n \leq b_m$$

$$x_j \geq 0$$

These mathematical expressions can also be seen in **Table B-1**.

In the FORPLAN formulation, the linear equations (rows) represent resource production functions, costs, and acreage or other types of constraints. For example, row 1 might represent timber production, row 2 might represent total cost, row 3 might represent acres burned by wildfire. The columns $j=1, n$ represent the different activities (prescriptions) which can occur over time on specific units of land called analysis areas (represented by x_j). The a_{ij} coefficients in the Matrix are the production, cost, or resource coefficients associated with each prescription/analysis area combination. The b_i 's are the right-hand side constraints representing exact amounts (=) or upper () or lower () constraint levels that must be

**Table B-1
Matrix**

	Column j=1	Column j=2	Column j=3	Column j=n	Constraint Type	Right Hand Side Constraint
Objective Function	c_1x_1	c_2x_2	c_3x_3	c_nx_n	Maximize	
Row i=1 (timber)	$a_{11}x_1$	$a_{12}x_2$	$a_{13}x_3$	$a_{1n}x_n$	\geq	b_1
Row i=2 (Cost)	$a_{21}x_1$	$a_{22}x_2$	$a_{23}x_3$	$a_{2n}x_n$	c	b_2
Row i=m	$a_{m1}x_1$	$a_{m2}x_2$	$a_{m3}x_3$	$a_{mn}x_n$	=	b_m
				x_j	\geq	0

$i=1, m; j=1, n$

met In the example above, if row 1 represented timber production, the interpretation of the constraint

$$a_{11}x_1 + a_{12}x_2 + a_{13}x_3 + \dots + a_{1n}x_n > b_1$$

would be the total amount of timber produced from all prescriptions and analysis areas must be greater than or equal to the amount of b_1

In the Forest planning model, with few exceptions, the objective function is to maximize present net value (PNV) for 10 decades for each prescription/analysis area combination. PNV, expressed in dollars, is a total of all benefits and costs, discounted to the present time.

The FORPLAN model was built by representing the production functions, costs, values, and resource supplies for the Forests in the mathematical format described above. For the Shasta-Trinity National Forests the resulting model contained approximately 7,400 columns and 1,500 rows. Once the model was formulated, several test runs were made to check the model for reasonableness and to make additional calibrations. Land allocations, activity and output schedules, costs, benefits, and PNV were developed by altering the prescriptions' intensity. The objective function and constraints were then set to meet the theme of each alternative and benchmark.

Unique constraint sets were developed to represent minimum management requirements (MMRs), minimum implementation requirements (MIRs), Forest management requirements (FMRs) common to all alternatives, and specific land allocations and output schedules needed for individual alternatives.

An iterative process was used to formulate these constraint sets prior to making final FORPLAN runs for the alternatives and benchmarks (see the Benchmarks and Alternatives Sections [M and N], respectively, of this Appendix).

FORPLAN was used to determine the most cost-efficient mix of goods and services that could be produced from the Forests based on the objectives and constraints of each alternative. The tradeoffs made among alternatives were examined, and the costs and benefits associated with each objective or constraint were measured. This analysis provided a way of indirectly evaluating the nonpriced benefits by measuring the amount of PNV foregone. The final criterion used to evaluate alternatives was net public benefits (NPBs), the PNV plus consideration of non-quantifiable Forest resource benefits.

Management activities modeled in FORPLAN were determined by the Forests' interdisciplinary team. This pre-FORPLAN analysis included identifying

- The activities that could be applied to National Forest system land,
- those activities that could be modeled in FORPLAN.
- the bounds of land to which each activity could be applied.
- the costs, outputs, and benefits which would result from the application of each activity to a specific type of land, and
- the compatibility of activities when applied to the same land area.

This provided the basis for a matrix of all possible management activities which could be modeled, along with their associated costs, outputs, and benefits

B. Land Units

Capability areas are the smallest units of land (or water) for which data is collected in forest planning. They are discrete and recognizable units classified according to physical (soil), biological (vegetation), and administrative factors. All land within a capability area is homogeneous in its ability to produce resource outputs and in its production limitations. The capability areas are homogeneous with respect to land status, forest type, condition class, and National Forest group (i.e. Shasta National Forest and Trinity National Forest)

Additional information was also needed for each capability area to assess resource opportunities and public issues. A few of the important items assessed included Ranger District boundary, compartment boundary, slope, aspect, timber productivity class, timber suitability for regeneration, length of perennial, inner gorge, and intermittent streams, spotted owl habitat conservation areas (HCAs), and roadless areas. (For more detailed information see the LMP90 Data Dictionary for Land Management Planning, June, 1992)

Because there are over 67,000 capability areas within the Forests, they could not all be used in FORPLAN. Use of such a large number of land units would be cumbersome and expensive and would have exceeded the matrix size limits that can be used in FORPLAN. Analysis areas were created to handle this problem. Conceptually, an analysis area is an aggregate of capability areas that responds to a given management prescription in a uniform way.

The delineation of the analysis areas involved aggregation of the capability areas into approximately 90 analysis areas, based on physical, biological, and administrative attributes. Major considerations in attribute selection were timber yield capability and cost. The selection of which attributes to include in FORPLAN was guided by factors such as forest type, condition class, site class, slope, and accessibility, these factors are the largest determinants of yield and cost.

Next, the analysis areas were defined using each attribute as a level of stratification or level identifier in FORPLAN. Because of model size limitations, the number of attributes selected initially exceeded the number that could be used. This necessitated the selection of the most critical attributes necessary to address the planning problems and

to consider the reliability of the data for making yield and cost estimates. The attributes selected and the categories within each attribute were defined as follows:

National Forest Group

Shasta National Forest
Trinity National Forest

Habitat Conservation Area/Late-Successional Reserves

Inside HCA/LSR
Outside HCA/LSR

Quarter township: 50-II-40

(Applies to all Alternatives except PRF)
Quarter township meets 50-11-40
Quarter township does not meet 50-11-40

Timber Suitability

Lands potentially suitable for all timber intensities
Lands potentially suitable for all timber intensities, except thinning.
Lands unsuitable for regulated timber harvest

Forest Type

Douglas-fir (DF)
Grass (GR)
Hardwoods (HW)
Knobcone Pine (KP)
Lodgepole Pine (LP)
Mixed Conifer (MC)
Ponderosa Pine (PP)
Red Fir (RF)

Condition Class

SM Regeneration growing under GTR
P1 Plantations 0-10 years
P2 Plantations 11-20 years
P3 Plantations 21-35 years
2G saplings and poles 40 percent crown closure
2P saplings and poles 40 percent crown closure
3G small and medium sawtimber 40 percent crown closure
3P small and medium sawtimber 40 percent crown closure
4G large sawtimber 40 percent crown closure
HW Hardwood on Conifer site
XX All size and density classes

The **National Forest group** identifier was used to determine how FORPLAN treats timber regulation between the two Forests. Although the entire Shasta-Trinity National Forests was modeled as a whole, the Shasta and Trinity Forests present distinctive and contrasting differences.

Appendix B - The Modeling and Analysis Process

ces with respect to standing timber inventory, growing stock, and growth conditions. Unique timber yield tables were developed by Forest

The **Habitat Conservation Area (HCA)/Late Successional Reserve (LSR)** identifier was used to separate analysis areas by HCA-LSR/non-HCA-LSR as required for analysis of 50-11-40 except for PRF. Land inside HCA/LSR boundaries is withdrawn from the quarter township 50-11-40 analysis.

The **Quarter township: 50-11-40** identifier was used to separate quarter townships that meet 50-11-40 from those that don't in all alternatives except PRF. According to the Interagency Scientific Committee's report, "Conservation Strategy for the Northern Spotted Owl" (April 1990) no regeneration harvesting may occur in a quarter township unless more than 50% of the acres have trees with an average dbh of 11 inches and 40% crown cover (on those acres capable of meeting the requirement).

The **timber suitability level** identifier was used to determine the range of timber intensities could be applied to each analysis area based on suitability for regeneration.

The **forest type and condition class** identifiers were structured in accordance with the RAMPREP yield tables used in FORPLAN. A unique set of cost/financial tables was also used with various combinations of these identifiers.

C. Management Areas

National Forest land within the Shasta-Trinity National Forests has been divided into 22 management areas. Each area has distinct management direction in response to local issues and intrinsic resource opportunities. However, these areas were not identified as management areas in FORPLAN. They will be used as a means of disaggregating FORPLAN outputs from the Preferred Alternative to the Ranger District level.

D. Prescriptions

A prescription consists of a set of management practices and the schedule for application to achieve desired objectives on a specific area. For a given analysis area, the range of prescriptions describes what could be done (i.e., the possibilities) on that area. FORPLAN is used to determine what should be done based on the constraints and objective function of an alternative.

Prescriptions used in Forest modeling were derived from management prescriptions developed by the Forests' interdisciplinary team. Management prescriptions are a mix of compatible management practices. The interdisciplinary team quantified the outputs, costs, and benefits that would occur when a prescription is applied to a given analysis area or unit of land. This quantification process produced the outputs, costs, and benefit coefficients that were used in the FORPLAN yield and economic tables.

I. Management Prescriptions It is important to distinguish between FORPLAN prescriptions and management prescriptions. FORPLAN prescriptions are sets of activities which could occur on the analysis areas; they can be modeled in FORPLAN. They are "generic" activities in that they are written without imposition of standards and guidelines needed to fit activities to site specific conditions. Management prescriptions, on the other hand, are written as a result of allocating FORPLAN prescriptions to specific land areas and imposing certain standards and guidelines. A management prescription includes the FORPLAN prescription as one of its parts, but it also includes additional practices needed to meet standards and guidelines at specific sites.

FORPLAN prescriptions are developed to allow for a full range of management activities on an analysis area. In that way a choice can be made between an intensive management practice or a non-intensive management practice. Limiting the number of prescriptions to choose from is a type of "built-in" constraint. The choice of prescriptions identified for each analysis area was constrained only by technical feasibility. The FORPLAN prescriptions which were analyzed are described below. Additional information, as well as the prescriptions and the prescription development process, is included in Chapter II.

2. FORPLAN Prescriptions The prescriptions listed below consist of two levels: Management Emphasis (ME) and Management Intensity (MI). ME levels are generally equivalent to prescriptions, while MI levels are analogous to management practices or options related to the prescription itself.

The descriptions below summarize the ME/MI combinations shown in detail in **Table B-2**. This table shows the relationship between FORPLAN prescriptions and management prescriptions. Some of the FORPLAN prescriptions are applied to more than one management prescription or to certain types of analysis areas (e.g., unsuitable timber land analysis areas).

a The following are timber management related FORPLAN prescriptions.

Table B-2
 Management Prescription FORPLAN Prescription Linkage
 Timber Management Related Prescriptions

Management Prescription	Management Emphasis'	FORPLAN Prescription	Management Intensity
I Unmaded Non-Motorized Recreation	TM-UNS	Unsuitable	
II limited Roaded Motorized Recreation	TM-MRG	Stand Maintenance	
III Roaded Recreation Partial Retention	TM-REG	Clearcut Green Tree Retention Shelterwood Selection Stand Maintenance Commercial Thinning	
Retentron Shasta Lake NRA	TM-MRG TM-UNS	Stand Maintenance Unsuitable	
IV Roaded, High Density Recreation	TM-UNS	Unsuitable	
V Wilderness Management	TM-UNS	Unsuitable	
VI Wildlife Habitat Management	TM-REG	Clearcut Green Tree Retention Shelterwood Selection Stand Maintenance Commercial Thinning	
VII Threatened, Endangered, & Selected Sensitive Species			
Bald Eagles	TM-UNS	Unsuitable	
Peregrine Falcons	TM-UNS	Unsuitable	
Goshawks	TM-UNS	Unsuitable	
Sensitive Plants	TM-UNS	Unsuitable	
Spotted Owls	TM-UNS TM-MRG	Unsuitable Stand Maintenance	
VIII Commercial Wood Products Emphasis/Timber Management	TM-REG	Clearcut Green Tree Retention Shelterwood Selection Stand Maintenance Commercial Thinning	
IX Riparian Management			
Perennial Streams/Inner Gorge	TM-MRG	Stand Maintenance	
Intermittent/Ephemeral Streams	TM-UNS TM-UNS TM-REG	Unsuitable Unsuitable Clearcut Green Tree Retention Shelterwood Selection Commercial Thinning Stand Maintenance	
X Special Area Management	TM-UNS	Unsuitable	
XI Heritage Resource Management	TM-UNS	Unsuitable	
Non-capable, Unavailable, and Unsuitable Land Within Above Management Prescriptions	TM-UNS	Unsuitable	
Developed Recreation	DEVREC	Low Standard Standard Rehabilitation New Construction	

**Table B-2
(Continued)**

Timber Management Related Prescriptions **

Management Prescription	FORPLAN Prescription	
	Management Emphasis*	Management Intensity
Dispersed Recreation	DSPREC	Low Standard Standard Rehabilitation New Construction
Fire Management	FIRE	NFMAS Program -25% Program

* TM-MRG Timber Management-Marginal Yield Objectives
 TM-REG Timber Management
 TM-UNS Timber Management-Unsuitable Lands

- | | |
|--|---|
| <p>(1) <u>Timber Management-Unsuitable Lands (TM-UNS)</u> This prescription applies to all lands from which no chargeable timber volume is planned. Management objectives either preclude timber production or are so restrictive that silvicultural objectives cannot be met. Examples are non-capable, unavailable, and unsuitable lands, proposed wildernesses and research natural areas (RNAs), cultural and developed recreation sites, and threatened and endangered species (T&E) habitats.</p> <p>(2) <u>Timber Management-Marginal Yield Objectives (TM-MRG)</u> This prescription includes suitable timber lands where management objectives are such that some minor timber yields are scheduled. Another name for this prescription is <u>Minimal Timber</u>. Average rotation age is 200 years. Timber outputs are regulated as a separate, non-interchangeable component of the allowable sale quantity (ASQ). Stand maintenance and salvage are included in this prescription. Examples of areas where this prescription applies are in visual retention areas and semi-primitive motorized recreation areas.</p> <p>(3) <u>Timber Management-Reduced Yield Objectives (TM-REG)</u> Includes suitable timber lands where management objectives allow for even-aged and uneven-aged systems. Rotations vary from 90 to 160 years with the average rotation being 120 years.</p> <p>b Prescriptions were also made for developed recreation, dispersed recreation, and fire management. Alternative program levels were analyzed for each alternative. These resource program related prescriptions were defined as follows:</p> | <p>(1) <u>Developed Recreation-Low Standard (DNREC-LOWSTD)</u> Existing facilities would be open at a level such that the user's willingness to pay is less than at the standard level.</p> <p>(2) <u>Developed Recreation-Standard (DEVREC-STNDRD)</u> Existing facilities would be open with all improvements and operation at standard levels.</p> <p>(3) <u>Developed Recreation-Rehabilitation (DEVREC-REHABST)</u> Facilities at low standard condition are rehabilitated to the standard level resulting in outputs at the standard level.</p> <p>(4) <u>Developed Recreation-New Construction (DEVREC-NCONST)</u> Facilities can be built on certain lands to standard level.</p> <p>(5) <u>Dispersed Recreation-Low Standard (DSPREC-LOWSTD)</u> Existing roads and trails would be open at a level such that the user's willingness to pay is less than at the standard level.</p> <p>(6) <u>Dispersed Recreation-Standard (DSPREC-STNDRD)</u> Existing trails would be open and maintained at standard levels.</p> <p>(7) <u>Dispersed Recreation-Rehabilitation (DSPREC-REHABST)</u> - Existing roads and trails at low standard are rehabilitated to the standard level resulting in outputs at the standard level.</p> <p>(8) <u>Dispersed Recreation-New Construction (DSPREC-NCONST)</u> Facilities can be built to standard levels.</p> <p>(9) <u>Fire Management Program (FIRE)</u> - Consists of varied mixes of manpower, engines, prevention, detection, and aircraft resources, along with fuels management. The most efficient program was</p> |
|--|---|

detection, and aircraft resources, along with fuels management. The most efficient program was selected and then reduced 25 percent to respond to budget issues.

3. Assignment of Timber Management Intensities by Analysis Area Based on the technical suitability of the land, certain intensities are applied. These intensities vary from analysis areas that are less than 40 percent slope, and forest types and condition classes of MC3G, DF3G, RRN, and MC2G where all intensities are considered; to analysis areas that are unsuitable for regulated harvest where only Unsuitable is applied

Unsuitable is applied as an option on all lands. For any of the analysis areas doing nothing and allocating the land to **Unsuitable** is always an option

Stand Maintenance is applied to all suitable timber land. Since this intensity removes so little timber volume during any entry, it can be applied on areas where regeneration is very difficult (i.e. low site)

Selection is limited to land that is less than 40 percent slope and forest types and condition classes of RF2N, DF3G, MC2G, MC3G, and PP3P exist. Because of the difficulty of using cable logging systems with **Selection**, it is not considered feasible on slopes greater than 40 percent. Where suitable acres are not open to regeneration harvest, selection cutting is permitted only on high site land. Forest types and condition classes that are old and/or poorly stocked are also considered unsuitable for this intensity

Shelterwood can be applied on any suitable high site lands where the following forest types and condition classes exist: DF4G, DF3G, MC3G, MC2G, RF3G, RF2N and plantations. Shelterwood is not applied on poorly stocked lands because many of these areas do not have 10 to 20 percent good crown, seed/shelter trees, which are considered the minimum stocking necessary to apply this intensity. Shelterwood is also not applied in low site land where regeneration harvest is not permitted

Green Tree Retention is applied only on lands suitable for regeneration harvest

Thinning to the 50-1 1-40 rule for all alternatives except PRF and an all available land under alternative PRF can be applied to any suitable timber land with any commercial species except lodgepole pine or hardwoods

Clearcutting is applied only on lands suitable for intensive even-aged harvest systems. The difficulty of obtaining regeneration on other lands precludes this intensity from these analysis areas.

From a financial analysis standpoint no timber management intensities were eliminated because of having a low or negative present net value (PNV)

E. Time Periods

To facilitate modeling the scheduling of outputs and activities on the Forests for the 150 year planning horizon, 10 years (one decade) was the basic reporting period chosen. Consequently, outputs are modeled as totals or averages for 10 year periods, and constraints were applied to outputs or activities on a 10 year basis. In order to reduce the complexity of data displayed in this FEIS five decades are used in all display tables

F. Outputs

Development of Modeling Coefficients Following is a description of the coefficients used for outputs tracked inside and outside of FORPLAN. A brief discussion of how each coefficient was developed is also included here. **Table B-3** shows a listing of all outputs used in the analysis process

a. Modeled Inside FORPLAN

Facilities

Road Construction/Reconstruction. When the road network is completed, it is assumed that an average road density of 6 miles/square mile will exist on suitable timber land. For analysis areas defined as roaded 3.5 miles per square mile are assumed to have already been built and thus 2.5 miles per square mile are needed. For roadless areas 6 miles/square mile of new roads will be needed. For group selection the average road density is increased to 7 miles/square mile to complete a road network. Otherwise, the same assumptions apply as stated above.

Forty percent of the roads are proportional to acres treated by management intensity and 60 percent due to allocation. The rates of development vary by FORPLAN prescription. In decade 1, for timber management, 30 percent of the needed roads will be built. For Modified Timber, 45 percent will be built in decade 1

Appendix B - The Modeling and Analysis Process

Table B-3
Outputs Used in Analysis

Output	Units of Measure	Modeled inside FORPLAN	Modeled Outside FORPLAN
Facilities			
Transportation			
Trail Construction	Miles		X
Road Construction	Miles	X	
Road Reconstruction	Miles	X	
Road System	Miles		X
Dams and Reservoirs	Number		X
Administrative Sites	Number		X
Fire and Fuels			
Fuel Treatment (Timber)	Acres	X	
Fuel treatment (Non-timber)	Acres	X	
Expected Acres Burned by Wildfire	Acres		X
Fish			
Resident (Other than T&E)	MLbs		X
Anadromous Fish			
Commercial Harvest	MLbs		X
Sport	MLbs		X
Fish User Days - Total	FUDs	X	
Direct Habitat Improvement			
Inland Fish (except T&E)	Acres		X
Anadromous Fish - Sport	Acres		X
Total	Acres		X
Direct Habitat Improvement			
Inland Fish (except T&E)	Acres/# of Structures		X
Anadromous Fish - Commercial	Acres/# of Structures		X
Anadromous Fish - Sport	Acres/# of structures		X
Human Resources			
Programs	# of Enrollees		X
lands and Minerals			
Land Acquisition	Acres		X
Minerals (Operating Plans)	# of Plans		X
Range			
Grazing	AMs	X	
Recreation			
Developed Public Recreation	RVDs	X	
Developed Private Recreation	RVDs	X	
Dispersed Recreation	RVDs	X	
Wilderness	RVDs	X	
Area Open to OHV Use	Acres		X
Area Closed to OHV Use	Acres		X
Area Restricted to OHV Use	Acres		X
Area with Seasonal OHV Use	Acres		X
Recreation Opportunity Spectrum (ROS)	Acres		X
Timber			
Allowable Sale Quantity (ASQ)	MMCF/MMBF	X	
Reforestation	Acres	X	
Timber Stand Improvement	Acres	X	
Firewood	MCords		X
Dispersion	Acres	X	
Visual Quality			
visual Quality Index			X
Effective Alteration	Acres	X	
Water			
Water Quality	Acres/Feet (at standard)		X

**Table B-3
(Continued)**

Output	Units of Measure	Modeled Inside FORPLAN	Modeled Outside FORPLAN
Water (Continued)			
Increased Water Quantity (Water Yield)	Acres Feet	X	
Watershed Improvement	Acres		X
Watershed Condition/Cumulative Watershed Impacts	ERA Acres	X	
Wildlife			
Threatened & Endangered (T&E) and Sensitive Species:			
Bald Eagle	Acres-	X	
Goshawk	Acres		X
Peregrine Falcon	Acres	X	
Spotted Owl	Acres	X	
Habitat Capability (Other than T&E)			
Big Game - Deer	Animal #		X
Wildlife User Days - Background			
Habitat Improvement	WUDs	X	
All Species	WUDs		X
Habitat Improvement			
All Species	Acres# of Structures		X
Seral Stages - Wildlife Habitat Relationships	Acres	X	

Abbreviated Terms and Meanings

AMs	Animal Months
ERA	Equivalent Road Acres
FUDs	Fish User Days
MCords	Thousand Cords
MLbs	Thousand Pounds
MMBF	Million Board Feet
MMCF	Million Cubic Feet
OHV	Off-highway Vehicle
RVDs	Recreation Visitor Days
WUDs	Wildlife User Days

For road reconstruction it is assumed that 325 miles of road will have to be built for every million board feet of timber produced

Fire and Fuels

Fuel Treatment (Timber and Non-Timber) This output is the sum of two kinds of fuel treatments natural and activity fuel. The natural fuel treatment acres were calculated by adding the probable acres to be treated for wildlife habitat improvement to the acres to be treated under a fuels management program. Acres treated under activity fuels were calculated directly from FORPLAN using acres treated for site preparation. These outputs are coincidental to other activities and require no suitable timber land acre constraints

Fisheries

Fish User Days (FUDs) and Direct Habitat Improvement (Acres) Over 90 percent of the FUDs are assumed to occur as background. For all alternatives these are included in FORPLAN, and they increase at 15 percent annually. Ten percent of the background FUDs are assumed to be produced from anadromous fish and 90 percent from inland fish. The remaining FUDs are produced as a result of direct habitat improvement. Total direct habitat acres are estimated based on the theme of the alternative.

Range

Grazing This output measures actual animal months (AMs) per acre per year. This is based on the assumption that 50 AMs will be produced for each MMBF of timber harvested

Table B-4
RAMPREP Yield Tables Used

Existing Strata	Dunning Site Class	
	Shasta	Trinity
M2G	III	II
M2P	III	III
M3G - High	II	III
M3G - Low	V	V
M3P - High	II	III
M3P - Low	V	V
D3G	N/A	I
D3P	N/A	II
D4G	N/A	I
R2N	V	N/A
R3G	III	N/A
R3P	III	N/A
P3P	IV	N/A
LPX	IV	N/A
Regenerated Stands		
High	II	III
Low	IV	IV

Recreation

Developed Public and Private Recreation A coefficient representing recreation visitor days (RVDs)/acre/year was developed by determining the annual number of RVDs which are provided by the total acres of existing land for developed site recreation. The source of the data used in development of coefficients was the Recreation Information Management System (RIM) and the National Forest Recreation Survey (NFRS). Alternatives vary by the proportion of demand achieved by low versus standard RVDs. No tentatively suitable timber acres are constrained for this purpose.

Dispersed Recreation A coefficient representing RVDs/acre/year for dispersed recreation was developed by using RIM data to determine the annual number of RVDs which are provided by the total acres of average suitability land for dispersed recreation. Alternatives vary by the proportion of demand achieved by low versus standard RVDs. No suitable timber acres are constrained for this purpose.

Wilderness Coefficients for wilderness recreation use were developed by dividing the total area in wilderness (as of 1982) by the total RVDs use figures from RIM. Alternatives vary by the proportion of demand achieved by low versus standard RVDs.

Timber

Allowable Sole Quantity (ASQ) Timber yield coefficients were developed from a Forest timber inventory completed in 1980 and updated in 1990. Data from this inventory was used to develop yield tables using a growth simulation model called RAMPREP. Growth and yield modeling was done for each timber stratum/type and site class for both existing and future regenerated stands. See Table B-4.

Inventory data and RAMPREP yield tables are included in the Forest planning records and are available for review at the Forest Supervisor's Office in Redding, California.

Reforestation Reforestation acres were equal to the acres of regenerated timber harvests scheduled by FORPLAN. Regenerated harvests included clearcutting, green tree retention, shelterwood cutting, and selection cutting. This allows for a small amount of natural regeneration and some replanting.

Timber Stand Improvement (TSI) TSI includes release and precommercial thinning. The acres of TSI treatment were based on a percentage of the reforestation acres. Approximately 90 percent of the reforestation acres (including backlog) were assumed to require a release treatment and 60 percent would be precommercially thinned.

Dispersion The intent of this output and constraint is to leave manageable units between harvest units which are considered openings. This requirement applies only to regeneration harvest openings created by even-aged timber management. An opening created by even-aged timber management will no longer be considered an opening once the trees have reached 4.5 feet in height.

Coefficients were developed to depict the number of regeneration harvest acres that could be cut in any one decade to meet dispersion requirements. The actual coefficients used were based on studies done on sample photos and compartments on the Eldorado, Plumas, and Sierra National Forests. Coefficients used were developed by the Pacific Southwest Region (Region 5) and incorporated into the Forests' FORPLAN analysis.

Dispersion is a proxy for the visual quality objective (VQO) Maximum Modification. Permissible maximums were defined and applied to the FORPLAN model as a constraint. For an Intensive Timber regime, not more than 34 percent of the dispersion altered acres and not more than 23 percent of the timber inventory could be

harvested over *two* decades. See planning record Dispersion of Timber Harvest for more information.

Visual Quality

Effective Alteration (EFFALT) This output is expressed in acres effectively altered by vegetation changes. Coefficients were developed to depict the number of regeneration harvest acres that could be cut in any one decade to meet visual resource requirements. The actual coefficients used were devised from analysis of perspective modeling done in Region 5. Coefficients used were developed by the Region and incorporated into the Forests' FORPLAN analysis.

Permissible maximums of visually altered acres were defined by VQO. A table for each VQO class was constructed. Within this table, maximums were also defined for the percent of timber inventory that could be harvested by VQO class. These constraints were then linked to FORPLAN prescriptions.

Under a Minimal Timber regime (TM-MRG) not more than 5 percent of the timber inventory could be harvested in any decade (Retention VQO). For a Regular Timber regime (TM-REG) not more than 15 percent of the visually altered acres could be harvested over two decades and not more than 15 percent of the timber inventory (Partial Retention VQO).

Tentatively suitable timber acres devoted to TM-MRG, and TM-REG regimes vary according to the theme of the alternative. For more information on how TM-MRG, and TM-REG vary by alternative see the Constraints Unique to An Alternative Section in this Appendix.

Water

Increased Quantity (Water Yield) Water yield outputs, derived from calculations using collected (U.S. Geological Service) water yield data and coefficients, take into account changes due to modification of the water balance caused by vegetative manipulation. Present water yield was determined by extrapolating measured flows from 23 Geological Survey gauging stations located within or near the National Forests. From this data a Forest-wide average water yield was calculated.

To account for the variability of runoff from various Forest types, the 30 identified timber (vegetation) strata for the Forests were combined into five groups having similar runoff characteristics. The Forest-wide average water yield was modified to determine a runoff coefficient reflective of the groups' runoff potential. Group 1 con-

sists of timber strata having high evapotranspiration rates, and thus low runoff rates. The Group 1 runoff coefficient is 2.2 feet/acre/year. Group 5 consists of timber strata having high runoff rates such as rock outcrop and surface water. The Group 5 runoff coefficient is 4.7 feet/acre/year. Groups 2, 3, and 4 have runoff coefficients of 2.5, 2.9, and 3.4 feet/acre/year, respectively.

Changes in water yield due to forest management activities were calculated based on temporary type conversion from one stratum to another, such as brush (2.5 feet/acre/year) to grass (3.4 feet/acre/year). When prescribed management reduces evapotranspiration by reducing vegetation, the water yield increases initially, then decreases to pretreatment back over a period of 20 years. Management activities considered included clearcuts, shelterwood cuts, intermediate thinning and brush to grass conversion. Changes in water yield were calculated over the life of the plan using this time streaming method. Although water yield is affected by forest management practices, it is a coincidental output and requires no constraints on the suitable timber lands.

Watershed Condition/Cumulative Watershed Impacts The potential effects to watershed conditions were evaluated within FORPLAN through the evaluation of cumulative watershed impacts (Appendix H). A model was developed within FORPLAN which calculated Forest-wide Equivalent Road Acres (ERAs) generated from silvicultural activities for each decade. ERAs were calculated, within the model, through the use of disturbance coefficients for each type of harvest activity including clearcutting, selection harvesting, thinning, etc. These coefficients took into account site disturbance from either cable or tractor harvest systems and roading levels necessary to access harvest units. The resulting ERAs were adjusted over three decades to account for natural recovery due to revegetation. A residual 5 percent ERA was not reduced to account for retained system roads.

For all benchmarks and alternatives the Forest-wide ERAs are lower than the Forest-wide threshold of concern (TOC) constraints. Thus, no constraint was applied in the FORPLAN model for cumulative watershed impacts. This occurs because the dispersion and effort constraints are more constraining.

The potential effects of proposed management activities on watershed condition were evaluated outside of the FORPLAN model by distributing the individual Forest-wide ERAs generated by the FORPLAN model back to the 61 individual watersheds delineated on the Forests (see Appendix H). The EPA values for decades 1, 5, 10 and 15 were distributed back to the individual watersheds.

Appendix B - The Modeling and Analysis Process

in a manner proportional to their suitable timber acres, minus plantation acres

Each watershed was then grouped into its appropriate watershed condition class. These classes are based on the relationship between the watershed's ERA level and the TOC. Class 1 watersheds have ERA levels less than 40 percent of their TOC, Class 2 watersheds are between 40 and 80 percent of their TOC, and Class 3 watersheds have ERA levels greater than 80 percent of their TOC. For each of the decades evaluated the watershed acres and the number of watersheds in each watershed condition class were totaled.

This information illustrated the projected trends in watershed condition for each of the alternatives through the entire planning period. It also served as the basis for the analysis of the alternatives in Chapter IV.

Wildlife

Threatened and Endangered (T&E) and Sensitive Species.

Bald Eagle -- The bald eagle was modeled by delineating a number of acres (approximately 350 acres per territory) for current and potential bald eagle territories and assigning these acres to a timber unsuitable prescription.

Peregrine Falcon -- The peregrine falcon territories include approximately 2,100 acres (350 acres per territory), an insignificant amount of which is classified as suitable timber land.

Spotted Owl Habitat -- Spotted owl habitat for all alternatives except PRF was provided for based on the requirements of the Interagency Scientific Committee Report (ISC) and the Fish and Wildlife Service's proposed recovery plan for the spotted owl. The actual modeling took two forms: (1) acres identified in the ISC Report as Category I and II habitat capability areas (HCAs) were made unsuitable for any timber prescription. In addition, the Fish and Wildlife Service's critical habitat areas (CHAs) include areas not identified by the ISC, and it is also unsuitable; (2) all land outside of HCAs and CHAs and otherwise suitable for timber management is subject to the ISC 50-11-40 requirement. This requirement means that each quarter township must have 50 percent of the suitable timber land with 11 inch average diameter trees and 40 percent crown cover.

In summary, if the area is part of a HCA or CHA, it is unsuitable for timber management. Other areas are only suitable for TM-REG if the quarter township meets the

50-11-40 requirement, and only those acres in excess of the 50 percent rule are subject to any form of even-aged management (clearcut, green tree retention, group selection). All areas outside of HCAs and CHAs, that exceed 11-40, can be reduced to the 11-40 requirement, even if the quarter township is deficit, through the appropriate silvicultural prescription (thinning, overstory removal).

Alternative PRF had similar allocations and conditions but they are based on the Late-Successional Reserves (LSR) allocation identified in Chapter 4 of the accompanying Plan. The LSR acres were approximately equal to the HCA and DCA acres described above. The intent of 50-11-40 is met through a combination of riparian reserves, old growth inclusions and the green tree retention requirement.

Wildlife User Days (WUDs) Background Includes consumptive (ie. deer, bear) and non-consumptive WUDs. Consumptive WUDs are assumed to be 282,000 WUDs for decades 1, 2, 3, 4 and 5. Non-consumptive WUDs start at 282,000 WUDs and increase at a 15 percent annual rate. The background estimates are included in FORPLAN and are the same for every alternative.

Direct Habitat Improvement (WUDs and Acres) and Induced Habitat Improvement (WUDs) WUDs are produced by Forest Service activities in two ways: (1) by management intensities (ie. clearcutting, shelterwood, selection) which produce forage and, therefore, induced WUDs, and (2) by burning brush (direct habitat improvement - acres) which produces forage and direct WUDs.

The number of acres of direct habitat improvement varies by alternative. First, a goal is selected based on the theme of the alternative. Second, a FORPLAN run is made that determines induced WUDs based on the mix of management intensities. Third, the induced WUDs are subtracted from the goal and this determines the number of direct WUDs. Fourth, direct acres are estimated by multiplying WUDs by 1.33 Acres/WUD. Finally, the direct acres are input into FORPLAN to account for the total effect WUDs have on PNV inside the model.

Seral Stages - Wildlife Habitat Relationships Seven seral stages were tracked in FORPLAN ranging from seedlings and saplings to older over-mature habitat. Each forest type and condition class was assigned a proportion of each seral stage now and into the future. FORPLAN thus tracked the number of acres by seral stage for each decade. No suitable timber land acres were constrained to meet seral stage requirements.

b Modeled Outside FORPLAN

Facilities

Trail Construction/Reconstruction (Miles). No coefficients were developed. This output is based on historic averages with adjustments made for the theme of the alternative.

Road Maintenance (Miles) The number of miles of road maintenance is determined by the current maintenance miles plus new roads constructed for the midpoint of each decade.

Dams, Reservoirs and Administrative Sites (No.). There were no coefficients for this output. Estimates were made based on the budget and theme of the alternatives for the numbers of facilities that would be required.

Fire and Fuels

Expected Acres Burned by Wildfire Wildfire potential acres were calculated using the National Fire Management Analysis System (NFMAS). Fire modeling was done for specifically Identified Fire Management Analysis Zones using the 1970 decadal fires history records.

Data from the Forests' timber, range, wildlife, and wildfire inventories and records developed a vegetation description model which defined the existing situation. External calculations were made on vegetation change and resubmitted to the NFMAS to determine future vegetation description models impacts on timber, range, wildlife, watershed, and wildfire potential effects over time.

Fisheries

Inland Fish (Thousand [M] Pounds) Poundage estimates were individualized by inland coldwater streams and lakes (rainbow trout) and inland warmwater lakes (largemouth bass). In inland coldwater streams, the assumption was made that all identified low and moderate quality habitat could be increased to high to establish an initial ceiling potential.

With respect to inland coldwater lakes, the assumption was made that identified lake acreage was of low quality and one-third of it could be improved to moderate habitat quality. Also one-third of the identified warmwater lake acreage could be improved from moderate to high quality habitat.

The alternative's theme was used to determine production emphasis by inland fish species. For all three inland

fishery types, a potential resource increase was used to generate annual outputs in M lbs.

Anadromous Fish (M lbs) Numbers of fish and associated poundages were estimated for all alternatives, based on the potential catch of chinook salmon, coho salmon, and steelhead trout from National Forest lands in the Trinity River Basin. Escapement potential for these species was determined in concert with Region I, California Department of Fish and Game (DFG) fisheries personnel (October, 1984). The intent or theme of each alternative was then used to disaggregate total production based on the capability of the alternative to achieve full, high, moderate, or low production emphasis. Increased production was measured against the 1989 base level.

A potential resource increase ranging between 0.5 and 2.0 percent, depending upon alternative emphasis, was used for the anadromous sport fishery to generate annual outputs in M pounds. For the commercial fishery, resource outputs (M pounds) were projected at an evenflow increase (2 percent per year) for the 50-year period until the identified total production was attained.

Direct Habitat Improvement- Inland and Anadromous Fish (FUDs and Acres)

The number of acres was calculated as the product of the increase in pounds per acre in habitat quality according to the fishery. Anadromous fish structures are displayed at an average of 8 structures per acre. Inland coldwater streams would receive 10 structures per acre and inland warmwater lakes 14 structures per acre. Inland coldwater lakes would be improved through lake enrichment techniques (improvement of nutrients levels).

The total number of acres treated for direct habitat improvement for each fish type (inland and anadromous) were multiplied by management emphasis coefficients, disaggregated by habitat quality emphasis (low to moderate, low to high, etc.) and multiplied by the expected increase in FUDs per acre to achieve a FUD output for each decade for inland and anadromous fish.

Human Resources

Programs (Number of Enrollees) There were no coefficients for this output. Numbers were estimated using historical data and expected budget levels by alternative.

Lands and Minerals

Land Acquisition (Acres) There were no coefficients developed for this output. The acres in an annual purchase program, to more efficiently manage the Forests,

Appendix B - The Modeling and Analysis Process

were estimated by alternative. The number of acres varied by the theme of the alternative

Minerals (Operating Plans [Number of Plans]) There was no plans/acre coefficients developed for this output. The various outputs represent the estimated number of plans associated with locatable minerals, leasable minerals (i.e., oil, gas, and geothermal), and salable minerals (i.e., sand, gravel, stone, etc). Outputs vary by the number of acres potentially prohibited (withdrawn) or constrained for mineral development by the management prescriptions. Plans of operation represent the following:

- Work associated with notices of intent or plans of operation filed under 36 Code of Federal Regulations (CFR) 228. Includes preparation of Environmental Analyses/Environmental Impact Statements (EA/EIS), and approval and administration of plans of operation.
- Work associated with oil/gas or geothermal operations, including cooperation with US Geological Survey (USGS) and Bureau of Land Management (BLM).
- Work associated with administration, inventorying, and development of common mineral material resources for in-service use. Includes geological investigations and preparation of EA/EIS.

Recreation

Off-Highway Vehicle (OHV) Use - Areas Open, Closed, Restricted, and Seasonally Closed to OHV Use Acres of National Forest lands open, closed, and restricted to OHV use were determined by totaling the management prescription allocations which correspond to the above categories. Mileage figures by open, closed, and seasonally closed categories were derived similarly (i.e., through examining direction and permitted uses under each management prescription by alternative.)

Recreation Opportunity Spectrum (ROS) The number of acres of ROS class were based on the existing physical setting, scheduled recreation development, timber harvesting, and road and trail construction. Administrative setting was also considered.

Timber

Firewood (M Cords) This output was determined by the total number of firewood permits issued based on historic averages. No coefficients were developed.

Visual Quality

Visual Quality Index (VQI). The VQI was calculated for each alternative using standard Forest Service procedures. The VQI is a means of numerically displaying the effects of alternatives on overall visual quality. Weights were developed by Variety Class and degree of alteration. Those weightings were developed from public preferences for landscape views. See **Table B-5** for Visual Quality Index (VQI).

Water

Water Quality (Acre Feet) Water that meets water quantity standards is expressed in thousands of acre-feet units. This output was derived by adjusting total induced water yields for the Shasta-Trinity National Forests. Yields derived from watersheds needing to be improved were subtracted from the water yield figures reported by FORPLAN. All remaining yields were assumed to meet water quality standards.

Watershed Improvement (Acres) There were no coefficients for this output. It was assumed that watershed improvement acres would be the same for all alternatives as long as funding is available.

Wildlife

Goshawk Habitat One-hundred fifty territories were identified in all alternatives, with the acres per territory varying by alternative. All acres assigned to goshawk territories.

Table B-5
Visual Quality Index (VQI)

Weight	Variety Class A*	Variety Class B*	Variety Class C*
10	P or I		
9	R or II		
8		P or I	
7	M or IV	R or II	
6	MM or V	PR or III	PR or III
5	UM or VI	M or IV	
4		MM or V	M or V
3		UM or VI	
2			P or I, R or II
1			MM or V, UM or VI
0			

* P = Preservation
 R = Retention
 PR = Partial Retention
 M = Modification
 MM = Maximum Modification
 UM = Unacceptable Modification

are unsuitable for timber management Adjustments were made outside of FORPLAN

Big Game Numbers (Number of Deer) Estimates of the number of deer were primarily derived from (1) density coefficients of habitat types, (2) number of acres in those types, and (3) DFG census and harvest information. This analysis indicated an existing estimated base of 65,000 deer Numbers of deer are considered to be primarily a result of natural and/or man induced habitat alterations and/or processes over time.

Direct and Induced Habitat Improvement - Big Game and Other Wildlife Species (WUDs and Acres) The assumption is made that 85 percent of the direct and induced WUDs and acres calculated by the FORPLAN model are big game and 15 percent other species

G. Economics In FORPLAN

I. General The subject of economics is discussed throughout this Final EIS In Chapter II economics are covered in the alternative development process discussions, and they are displayed in various tables Chapter III describes the economic environment, the economic consequences are discussed in Chapter IV, and Appendix D outlines how economics are used in this document

Most of the economic efficiency analysis was done with the use of FORPLAN The economic data and assumptions that were incorporated into that model are described below

All dollar values are expressed in 1989 dollars. The following factors, based on the implicit price deflator for the gross national product, were used to adjust values from other years to 1989

A discount rate of 4.0 percent was used to determine the PNV of future benefits and costs. This rate approximates the long-term cost of capital in the private sector as measured by the return on AAA corporate bonds after adjustment for inflation

Real price trends for timber, range, recreation, wildlife and fish were used in all FORPLAN runs

These price trends are projections from an econometric model of national and regional markets updated for the 1990 Resources Planning Act Final Environmental Impact Statement.

2. Costs All costs used in the analysis are estimates based on accounting records and the experience of project managers. The most recent costs were collected (ie 1992 & 1993) and adjusted to 1989 dollars The

Year	Factor
1995-89	.82
1994-89	.85
1993-89	.87
1992-89	.90
1991-89	.93
1990-89	.96
1989-89	1.00

following costs were collected and loaded into FORPLAN

Facilities

RD-R - road reconstruction
 RD*N - road construction due to allocations
 RD-N - road construction due to acres harvested
 RD-M - road maintenance, existing
 SDNM - new road maintenance
 RDBD - roads to bed

Fire and Fuels

BRAC - cost of fighting fires
 FFP - nonsuppression costs

Range

WOA - operations and maintenance
 RNC - capital investments

Recreation

VOA - operations and maintenance
 VC - capital investments
 3038 -wilderness
 SPC, RH -trail maintenance
 SPC, NC -trail construction

Timber

SALE - sale preparation and administration
 SALV - salvage preparation and administration
 SITE - site preparation including brush disposal
 LNT - reforestation
 RPLT - replant
 RLSE - release
 CTH - precommercial thinning

Wildlife and Fish

W80 - wildlife operations and maintenance
 X80 - fisheries operations and maintenance

Appendix B - The Modeling and Analysis Process

Other

TTIT - general administration

MNLV - base level operational costs

Base level operational costs include general administration. FA&O maintenance, trail maintenance, minerals management, lands management, fire detection and initial attack, wildlife maintenance, and water maintenance

Of the various costs included in FORPLAN, those which varied most by alternative were capital investment costs associated with construction/reconstruction of roads and recreation facilities. Operations and maintenance costs, which varied significantly, were timber sale administration

Costs were checked for reasonableness by comparing the first decade costs for Alternative CUR, developed with the use of FORPLAN, against actual expenditures. Costs for the current alternative deviated by less than 5 percent from actual expenditures. This deviation was within acceptable standards of reliability for Forest planning

3. Benefits The dollar values for outputs used to calculate PNV are the prices that consumers would be willing to pay for Forest outputs, whether or not such prices are actually collected by the Federal Government. At present, it is national policy to provide most Forest outputs either at no charge to consumers or at a charge less than the willingness to pay price. (See **Table B-6**)

Benefits for outputs were computed by multiplying the output by the willingness to pay price. Output above the estimated demand was not valued.

For outputs used off-site, benefits are based on the value of the outputs as they leave the land or production site. For outputs used on-site, benefits are valued when use takes place. However, in cases where it is easier to derive values after the output leaves the production site, costs incurred and profits earned after the output leaves the site were deducted from the values at later production stages.

Grazing values are the average amount that National Forest permittees are willing to pay for grazing on the Forests as estimated from ranch livestock budgets developed by the USDA Economic Research Service.

Recreation Visitor Day (RVD) values are the estimated average amount that recreationists are willing to pay to participate in a recreation activity associated with a developed site and/or a dispersed recreation opportunity. These values

are based on a survey of travel cost and contingent value recreation studies conducted by the Forest Service for the Forest and Rangeland Renewable Resources Planning Act (RPA) evaluations for 1990.

Timber values are average actual timber receipts (including purchaser road credits) divided by harvest volume reported on cut and sold reports for the period 1988 to 1992 adjusted to 1989 dollars. Proration of price by forest type is based on recent selling values of the timber.

Water values The 1990 RPA recommended water value of \$59 per acre-foot was used. Essentially all of the water yield from the Shasta National Forest can be diverted for agriculture, hydroelectric power; or domestic use. On the Trinity National Forest, where very little of the water yield can be diverted, a value of \$6 per-acre foot was used. This \$6 value is a proportion of \$59, as determined by the acres of diverted and undiverted water sheds.

Wildlife and Fish User Day (WFUD) values are based on studies conducted for the Forest Service which were used in the RPA evaluations for 1990.

A demand curve was developed for WFUDs. This assumes a 15 percent annual increase for the next 5 decades. None of the projected outputs for any of the alternatives exceeded this level. (See **Table B-7**)

Values for Outputs that Exceed Demand

Benefit values are applied only where there is a demand for the output by the Forests' users. Outputs that exceed demand are given a benefit value of zero, while those that are produced at or below the quantity demanded by consumers are assigned the benefit value described in the previous section. This is handled with the use of a demand cut-off. A demand cut-off was used for RVDs. For this resource output, demand is less than the potential capacity of the Forests. Refer to **Table B-7**.

See Chapter 11 for a discussion on how costs and benefits interact to determine the PNV for each alternative and how non-valued benefits have trade-offs and opportunity costs.

H. Constraints

Constraints are quantifiable limits placed on the FORPLAN model to assure that only realistic and

Table B-6
Benefit Values Used in Analysis

Priced Output	Unit	Average Actual Cash Receipts per Unit of Output	Average Willingness to Pay Value Used In The Analysis
Timber			
Average All Species	MBF	97.00	221.00
Mixed Conifer Type	MBF	99.88	
Ponderosa Pine Type	MBF	133.15	
Douglas-fir Type	MBF	84.04	
Red-fir Type	MBF	57.28	
Lodgepole Pine Type	MBF	46.10	
Range	AMs	1.86	4.91
Recreation			
Dispersed (standard)	RVD	0.00	27.63
Dispersed (low)	RVD	0.00	5.75
Developed (standard)	RVD	0.57	11.20
Developed (low)	RVD	0.57	5.94
Wilderness (standard)	RVD	0.00	14.07
Wilderness (low)	RVD	0.00	6.71
Wildlife and Fish			
Big Game	WFUD	0.00	33.16
Non-game	WFUD	0.00	33.16
Inland Fish	WFUD	0.00	63.31
Anadromous Fish	WFUD	0.00	63.31
Commercial Harvest	Pounds	0.00	1.84
Water			
Shasta NF	Acre/feet	0.00	59.00
Trinity NF	Acre/feet	0.00	6.00

Abbreviated Terms and Meanings:

AMs Animal Months
 MBF Thousand Board Feet
 RVD Recreaaon Visitor Day
 WFUD Wildlife and Fish User Day

Table B-7
Recreation, Wildlife, and Fish Demand Curves Used in Analysis
(User Days)

Decade	Developed Recreation	Dispersed Recreation	Wildlife and Fish	Total
1	1,261,000	2,895,000	1,035,000	5,191,000
2	1,453,000	3,360,000	1,201,000	6,014,000
3	1,646,000	3,899,300	1,393,000	6,938,300
4	1,838,000	4,525,200	1,617,000	7,980,200
5	2,031,000	5,251,000	1,877,000	9,159,000

- Wilderness is a part of dispersed recreation. The demand curve for wilderness is assumed to be:
 decade 1 - 140,000; decade 2 - 163,000; decade 3 - 189,000; decade 4 - 219,000; decade 5 - 254,000.

Appendix B - The Modeling and Analysis Process

reasonable amounts of resources are used, that outputs are produced, and that prescription allocations are made

In a linear programming analysis, constraints supersede the objective function. Thus, where a predetermined level of output, minimum physical condition, or allocation is entered as a constraint, it is always achieved (or no feasible solution is found). Output levels and other desired effects, entered as constraints, are implicitly assumed to contribute more to public benefits than their cost of production plus the foregone public benefits of any outputs or other effects they replace in the solution. For this reason, the interdisciplinary team tried to formulate constraints that met objectives with the lowest cost and least effect on other outputs. In most cases, this required the formulation and testing of several alternative sets of constraints to determine the most cost effective set (in terms of PNV that would meet the objectives)

Five different categories of constraints were used

I. Minimum Management Requirements (MMRs) - These are constraints needed to meet MMRs or management standards. Procedures for defining the MMRs were specified by Region 5. MMRs are applied to all benchmarks and alternatives, but they are not applied to the unconstrained Maximum PNV assigned with Flow and Long-term Sustained Yield constraints (FLW) or the Minimum Level of Management (MLV) FORPLAN runs

The MMRs are taken from 36CFR 219.27 and generally represent requirements that are outside of Forest Service authority to change. They are based on statutes and regulations in contrast to manual direction or agency policy.

2. Minimum Implementation Requirements (MIRs) - These are constraints needed to assure that alternatives are minimally acceptable and implementable on the ground. Procedures for defining MIRs were specified by Region 5. They are within agency control, but there is little discretionary control regarding their application at the Forest level. MIRs do not apply to benchmarks, but they are applied to all alternatives.

3. Timber Policy Constraints - These are needed to ensure that timber harvest meets sustained yield, rotation length, and dispersion requirements. These constraints are applied in all benchmarks and alternatives, except for the non-declining yield constraint.

4. Forest Management Requirements (FMRs) - These constraints are needed to assure implementability at the local level. They are based on local (rather than Regional) conditions and issues. These constraints are not applied to benchmarks, but are applied to all alternatives except the Constrained Economically Efficient (CEE) FORPLAN Alternative. Opportunity costs associated with these constraints were depicted in FORPLAN Alternative CEF.

5. Forest Constraints That Vary Between Alternatives - These constraints are unique to individual alternatives. They are applied to meet the theme of individual alternatives. Land base constraints caused most of the difference between the Shasta-Trinity National Forests' alternatives.

See the Economic Comparisons Section of Chapter II for a discussion of the opportunity costs associated with each of the above constraints.

I. Minimum Management Requirements (MMRs)

Included in the following discussion of the MMRs is the rationale of how they were modeled in FORPLAN. All MMRs were modeled either directly or indirectly. That is, in some cases a constraint was used in the model which was intended to recognize more than one MMR.

I. Capable, Available, and Tentatively Suitable Timber Lands - The following criteria were used in identifying tentatively suitable timber lands in the Forests' data base:

- a. The land is forested and is producing or is capable of producing crops of industrial wood. This includes land which is at least 10 percent occupied by forest trees and/or land which has the biological growth potential of at least 20 cubic feet per acre per year.
- b. The land has not been withdrawn from timber production by Congress, the Secretary of Agriculture, or the Chief of the Forest Service. On the Shasta-Trinity National Forests, the Castle Crags, Chancelulla, Mt. Shasta, Trinity Alps, and Yolla Bolly-Middle Eel Wildernesses, as well as the Shasta Mud Flow Research Natural Area (RNA), have been withdrawn from timber production.
- c. Technology and knowledge exists and is available to ensure that timber is produced without irreversible damage to soil productivity, water quality, or water-

shed condition. Lands which are most prone to sediment production through mass wasting, such as inner gorges and recently active landslides, are identified, and classified as unsuitable.

- d Existing technology and knowledge, as reflected in current research and experience, provides reasonable assurance that adequate restocking can be attained within five years after final harvest
- e Significant cultural resource sites have been removed from the suitable timber land base

This MMR was modeled in FORPLAN by allocating cultural resource areas (2,000 acres), the Shasta Mud Flow RNA, existing Wilderness areas, non-forest, non-regenerable, non-capable, highly unstable areas, 600 foot corridor along the major inner gorge, and 300 foot corridor along the minor inner gorge as unsuitable (TM-UNS) for timber management

2. Threatened and Endangered (T&E) and Sensitive Species - including the following

- a Approved or current recovery, territory, and species management plans for population and habitat requirements were used

- b A target population level was assigned as follows

Bald eagle (35 pair) and
Peregrine falcon (14 pair)

- c Bald Eagle and Peregrine Falcon-

Population levels have been assigned by Region 5's Fish and Wildlife staff in conjunction with approved recovery plan requirements. Major active nesting areas would receive priority in management strategies.

This MMR was modeled in FORPLAN by allocating all currently identified and potential territories to TM-UNS. Most of these acres are within the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

- d Spotted Owl

All acres identified in the ISC report as Category I or II HCAs, plus the F&WS Critical Habitat, are modeled as TM-UNS. In addition, the allowable prescriptions on

Appendix B - The Modeling and Analysis Process

otherwise suitable land must comply with the 50-11-40 rule. This MMR is modeled slightly differently in the preferred alternative (PRF). All acres adopted as late successional and riparian reserve in the ROD from the President's Plan are modeled as TM-UNS.

Direction for Sensitive Species

- (1) A target population level was assigned as follows

Goshawk (150 pair)

- (2) Goshawk

Within its habitat range, goshawk territories would be managed to maintain a density of at least one territory per 18 square miles. Distances between territories or clumps of territories should not exceed 12 miles. A total of about 150 territories is assumed as the minimum level for the Forests. About 75 territories are on lands classified as tentatively suitable for timber.

Each territory would contain a minimum of 100 acres of habitat. This provides suitable conditions for the nest stand and an alternate nest stand.

A total of about 15,000 acres is assumed to be the minimum acreage to be managed for goshawks on the Forests. About 5,000 acres are on suitable timber lands not otherwise constrained by MMRs.

Currently active nest territories take preference in delineation of a population network.

Timber management activities would be excluded within occupied nest stands during the nesting period. During other periods of time, these activities should be limited to those activities which meet the criteria outlined in this MMR and the habitat variables associated with suitable habitat in the Forests' goshawk habitat capability model.

Direction for Snag-Dependent Species

To the extent possible, within each timber compartment an average of 1.5 snags per acre with the following specifications would be provided, maintained, and managed for:

- (1) 1.2 snags per acre between 15-24 inches diameter at breast height (d.b.h.) and greater than 20 feet high; and

Appendix B - The Modeling and Analysis Process

- (2) 0.3 snags per acre greater than 24 inches d b h and greater than 20 feet high

This MMR was modeled in FORPLAN by foregoing the timber yields from every other thinning in regenerated stands

3. Diversity of Plant and Animal Communities

- a Diversity consists of richness, evenness, and pattern, each element of which is considered in the diversity MMR
- b Diversity of plant and animal communities is achieved by providing a threshold level of vegetation types and seral stages found within the Shasta-Trinity National Forests
- c Plant and animal communities will be managed so that diversity will be similar to that already existing on the Forests. Reductions in diversity may be prescribed only when needed to meet the overall multiple-use objectives of an alternative
- d The MMR is to provide and maintain a minimum of 5 percent of each timber type/seral stage combination on the Forests as a whole. The total existing area in each type in forested lands was used as the base for this calculation
- e Both suitable and unsuitable timber lands were used to meet the diversity requirements as long as habitat characteristics for management indicator species (MIS) were fully met
- f Vegetative types and seral stages (total acres) will be distributed in proportion to their current acres in a given management area

This MMR was modeled in FORPLAN by accounting for seven seral stages ranging from seed/saplings to older over-mature habitat for each decade. All seral stages achieved the 5 percent minimum requirement on a Forest-wide basis without additional constraints

4. Riparian Area Management - Perennial Streams, lakes, and Reservoirs

- a No practices or prescriptions that cause detrimental changes to water quality, aquatic flora and fauna, and hydrophytic vegetation will be applied to perennial riparian areas
- b Emphasis will be given to riparian dependent resources. Other activities will be allowed to occur when compatible with dependent resources

This MMR was incorporated in FORPLAN by allocating a 200 foot corridor along all perennial streams to minimal timber (TM-MRG)

5. Soils and Water

- a Soil and water resources will be conserved. No significant or permanent impairment of the productivity of the land will be allowed.
- b Existing or potential watershed conditions that will influence soil productivity, water yield, water pollution, or hazardous events, such as landslides and stream channel destabilization, will be evaluated

The amount of land disturbance on sensitive watershed lands will be limited in order to avoid soil loss, activation of mass land failures, and degradation of water quality through sedimentation

This MMR relates to cumulative watershed impacts and was modeled in FORPLAN by estimating ERAs. The Forest-wide ERAs are lower than the Forest-wide TOC constraint. Thus, no constraint was applied in the FORPLAN model. This occurs because dispersion is more constraining than the TOC constraint (See K Timber Policy Constraints - 4 Dispersion)

6. Designated Wild, Scenic, and Recreation Rivers

- a These rivers are managed according to guidelines contained within the National Wild and Scenic Rivers Act. Management direction is focused on the maintenance and enhancement of these rivers for their recreation and scenic values.

- b. Lands adjacent to wild segments of the Wild and Scenic Riven System are unavailable for timber production. However, timber management activities can take place along the Scenic and Recreation River segments.

This MMR was modeled in FORPLAN by allocating 1R mile corridor along wild river to TM-UNS, scenic rivers to TM-MRG, and recreation rivers to TM-REG.

J. Minimum Implementation Requirements (MIRs)

Following is a listing of the MIRs, including a discussion of how they were modeled in FORPLAN. MIRs will be applied in the implementation of all alternatives.

I. Sensitive Plant Species

- a. Sensitive plants will be managed to ensure that these species do not become threatened or endangered because of management actions.
- b. Vegetation management practices will be planned to protect or enhance sensitive plant species.

The above can be met without constraining the FORPLAN model.

These MIRs were not modeled in FORPLAN. They will be met through standards and guidelines in the Forest Plan and through project level design and location considerations.

2. Visual Quality

Foregrounds and middlegrounds of the following scenic corridor travel routes will be maintained to partial retention visual objectives: officially designated California State and County scenic highways and California State Scenic Highway system routes (as identified in the 1970 Master Plan).

- a. The foreground portions (3/4 to 1 mile wide) and middleground portions (areas located from 1/4-1R to 3-5 miles from the viewer) of the following corridor will be managed to an adopted visual quality objective (VQO) of partial retention.
 - (1) US Highway 97;

Appendix B - The Modeling and Analysis Process

- (2) State Highway 3;
- (3) State Highway 36 (from its junction with State Highway 3 westward to the National Forest boundary),
- (4) State Highway 89,
- (5) Interstate Highway 5 (between US Highway 97 and State Highway 89)

This MIR was modeled by allocating the foreground and middleground areas to TM-REG.

3. Clearcutting

No more than 18 percent of the total suitable acres available for even-aged management can be clearcut in any one time period. This constraint was never binding in any time period in any alternative.

K. Timber Policy Constraints

Listed below are the detailed descriptions of the constraints used in the FORPLAN model in response to sustained yield, harvest flow, rotation length, and dispersion requirements.

I. Rotation Length and Culmination of Mean Annual Increment Requirements for Timber Harvest Scheduling.

- a. Mean annual increment was:
 - (1) Based on regenerated yields;

Table B-8
Minimum Age to Attain 13 inch, 50 foot Trees

Dunning Site	FORPLAN Period	Age
I & IA	4	35
II	5	45
III	6	55
IV	7	65
V	8	75
VI+	Generally stands in this site grow less than 20 cubic feet per acre per year. Therefore, generally these stands are not suitable for timber production.	

Appendix B - The Modeling and Analysis Process

**Table B-9
Minimum Rotations**

Forest Type	Without Thinning 95% CMAI	with Thinning 95% CMAI
Mixed Conifer - Trinity NF	60 years	90 year;
Mixed Conifer- Shasta NF	50 years	70 year;
Douglas-fir	50 years	70 year
Red fir	80 years	110 years
Ponderosa Pine	80 years	110 years
Lodgepole Pine	70 years	N/A

- (2) Calculated for each applicable FORPLAN prescription, and
- (3) Determined for sawlog products measured in cubic feet

- b For benchmarks and alternatives, minimum rotations were based on culmination of mean annual increment (CMAI) in utilized cubicfeetofmerchantable sizetrees. Regenerated timber stands are regarded as generally culminated in growth at the age that corresponds to 95 percent of the apparent culmination calculated from the managed yield projections used in FORPLAN. Culmination is always later than or equal to the age of merchantability
- c On the Forests, the age at CMA is equal to the age of merchantability on over 80 percent of the suitable timber lands. Therefore, rotation ages based on merchantability are the same as rotation ages based on CMA for FORPLAN modeling purposes

Merchantability occurs when the average projected d b h is 13 inches with an average projected tree height of 50 feet for stands maintained within the range of desired to optimum stocking. This is to insure that nearly all trees in the projected stand will be minimally merchantable and larger at first harvest.

The minimum age for attainment of 13-inch d b h, 50-foot height and 90 percent-BA MAX (for standard even-aged management) is assumed to be shown in **Table 8-8**.

The rotations included in FORPLAN matrices represent the range from culmination to the end of the planning horizon. This is for regenerated timber projected for harvest starting in any period that corresponds to a mean stratum age equal to that of culmination for regenerated stands. To the extent possible, each regeneration class in the FORPLAN

**Table B-10
Dispersion**

Forest Type	Site Class	Minimum Plumber of Trees per Acre
Ponderosa Pine	I	150
	II	125
	III	100
	IV	75
Red & White Fir	All	200
	All	125
	All	150

matrix included one timing choice that corresponded to minimum CMAI defined for the class. The FORPLAN minimum rotation lengths are shown in **Table 8-9**.

2. Sustained Yield Requirements

FORPLAN Modeling Rules To ensure that the Forests can sustain the timber harvest level past the end of the planning horizon, a FORPLAN constraint was applied that states timber harvest cannot exceed 95 percent of the long term sustained yield in decade 15.

3. Harvest Flow Requirements

FORPLAN Modeling Rules Timber output after the first decade is not allowed to fluctuate more than 15 percent from the previous decade. This prevents wide fluctuations from one decade to the next. The 15 percent limit is based on the portion of the current timber sale quantity required to support an average sawmill.

When non-declining yield was not applied (in benchmarks and sensitivity analyses), a harvest flow constraint of plus or minus 15 percent was applied.

4. Dispersion

- a The intent of the dispersion rule is to prevent regeneration units, which are still "openings," from being adjacent to each other. The intent is also to disperse units in such a way as to leave logical harvest units between openings for future management. This requirement applies only to regeneration harvest based on even-aged management. An opening created by even-aged timber management will no longer be considered an opening once the number of

trees, (See **Table B-10**), have reached 4.5 feet in height and are generally free to grow

- b. *FORPLAN Modeling Rules* The dispersion requirements are modeled in FORPLAN by limiting the number of acres which can be altered in any one decade. Separate constraints were used for each Forest and for each of the major forest types with significant acreages. The constraint for managed timber lands (TM-REG) was a harvest limit of not more than 34 percent of the acres in any two consecutive decades for decade 1, 32 percent for decade 2; 30 percent for decades 3 and 4, and 28 percent for decades 5-16. Also, a harvest limit of not more than 23 percent of the first decade timber inventory for decades 1-4 and 24 percent for decades 5-16 was imposed. See planning record Dispersion of Timber Harvest for more information.

L. Additional Forest Direction and Constraints

Personnel of the Shasta-Trinity National Forests have added a minimal number of constraints to the MMRs and MIRs already listed. The purposes of these constraints are twofold: to supplement, further interpret, and define the generalized direction in Region 5's MMRs, and to more completely respond to local Forest issues.

I. Forest Supplementation of Regional MMRs

Additional Forest direction and interpretations of Region 5's MMRs have not been modeled and are not considered additive to the MMRs. These supplementary directions are embedded in the Forest-wide standards and guidelines. Refer to the proposed Forest Plan.

2. Forest Management Requirements (FMRs)

- a. *Whiskeytown-Shasta-Trinity National Recreation Area (NRA)* The Shasta and Trinity Units of the NRA are included under all alternatives considered. However, a variety of resource activities are allowed under the NRA regulations as long as they are compatible with the recreation purpose of the area.

Appendix B - The Modeling and Analysis Process

This constraint was applied to all alternatives considered in detail because of the National importance of the area for public outdoor recreation. These values have been recognized by Congress through the Whiskeytown-Shasta-Trinity National Recreation Area Act (Public Law 89-336, November 8, 1965), and related regulations (36 CFR 251.4).

This constraint is modeled in FORPLAN by allocating the Shasta Unit to TM-UNS, the foreground viewing area of the Trinity Unit to TM-MRG; and the mid-ground of the Trinity Unit to TM-REG.

- c. *Visual resource management direction* is also provided for major travel corridor and viewsheds not included as MIRs. The foreground portions of three corridors were identified to be managed to a visual partial retention standard: (1) State Highway 299, (2) portions of Interstate 5 not identified in the 1970 California State Scenic Highway Master Plan for scenic highway designation, and (3) portions of Highway 36.

The Interstate 5 corridor south of State Highway 89 and Highway 36 and east of Highway 3, are examples of Forest-level visual constraints not covered by an MIR.

This constraint is needed because these three corridors carry the majority of the viewing public which travel through the Forests. State Highway 299 is a major east-west travel corridor between Redding and the north coast of California. It is also adjacent to an existing Recreation River (main stem Trinity River) in the National Wild and Scenic River System.

Interstate 5 provides an important and scenically-sensitive link between Redding, the Shasta Unit of the NRA, the Sacramento River corridor, and Mt. Shasta.

Highway 36 provides important access through the scenically-sensitive southern part of the Trinity National Forest.

This requirement was modeled in FORPLAN by allocating the foreground viewing areas along portions of Interstate 5, Highway 36, and Highway 299 to TM-REG.

- : *Poorly Stocked Areas* within *Bitterbrush*. These areas are included in the modeling to fulfill a need to maintain and/or enhance a key browse species on deer summer range. More importantly, setting aside these areas is

Appendix B - The Modeling and Analysis Process

in response to the need to enhance production of livestock (in this case, sheep) to meet RPA goals and provide a sufficient forage base to meet deer summer range and sheep allotment needs

This requirement was modeled in FORPLAN by allocating all poorly stocked bitterbrush areas to TM-UNS

- d *Maintaining on Average of 30 Square Feet of Hardwoods* on wildlife and visual areas is necessary to maintain wildlife species dependent on this habitat (i.e. gray squirrels) and is compatible with the VQO of partial retention

This requirement was modeled in FORPLAN by applying a 10 percent reduction in regenerated yields on the Trinity National Forest and a 5 percent reduction on the Shasta National Forest to prescription TM-REG

- e *Developed Recreation and Administrative Sites* were modeled by allocating FORPLAN prescription TM-UNS for all alternatives

- f *Special Interest Areas (SIAs)* Eight geologic areas and one botanical area are proposed for SIA consideration (See **Table III-14** for a listing of these areas) All of these areas involve unsuitable timber lands and/or consist of caves which do not affect surface uses. These areas were not identified in FORPLAN as being suitable timber lands

- g *Research Natural Areas (RNAs)* In addition to the already designated Shasta Mud Flow RNA, four additional areas are proposed for RNAs. These areas are Cedar Basin, Preacher Meadows, Red Butte-Red Fir Ridge, and Stuart Fork

This requirement was modeled in FORPLAN by allocating the areas to TM-UNS

- h *Riparian Areas Along Class I, II, and III Streams* The riparian standards, as described under management prescription IX in Chapter 4 of the Forest Plan, dictate how riparian areas will be managed in all alternatives except PRF. For modeling purposes the RMZ widths for Class I, II, and III streams were classified as unsuitable (TM-UNS). For alternative PRF see the riparian standards in chapter 4 of the final Forest Plan. The riparian standards for PRF classify Class I, II, III, and IV streams as TM-UNS

M. Benchmarks

I. FLW - Maximum Present Net Value (PNV) with Flow and long-Term Sustained Yield (LTSY) Constraints Benchmark

a Description and Purpose

- (1) Used to evaluate the appropriateness of harvest flow constraints
- (2) Used to provide the economic efficient level of valued resources with fewest constraints
- (3) Forms a base run used in evaluating MMRs

b Specifications

- (1) Objective Function Maximize PNV for 10 periods (decades)
- (2) Timber Policies
 - (a) Minimum rotation Merchantability (same as the culmination of mean annual increment [CMAI]),
 - (b) Includes sustained yield requirements,
 - (c) Includes harvest flow requirements.
 - (d) No dispersion was included
- (3) Land Base Includes all tentatively suitable lands
- (4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs

2. H2O - Water Yield Maximization Benchmark (for Five Periods [50 Years])

- a Description and Purpose Used to define maximum capability of the Forests to provide water over the RPA planning horizon subject to MMRs

b Specifications

- (1) Objective Function Maximize water yield (acre-feet) for five periods (decades)
- (2) Timber Policies
 - (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,
 - (b) Includes sustained yield requirements,
 - (c) Includes nondeclining yield requirements:

- (d) Includes dispersion.
- (3) Land Base. Includes all tentatively suitable land
- (4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs
- (5) All MMRs were applied.
- (6) Activity Constraints. Water yield activities provided for
 - (a) Type conversion to grass of selected chaparral lands not capable of growing 20 cubic feet of timber per acre per year About 42,000 acres were included
 - (b) Type conversion to grass of selected chaparral lands on suitable timber lands About 25,000 acres were included.
 - (c) Intensive harvesting of timber lands to provide high levels of water yield.
 - (d) Vegetative treatments in noncommercial vegetation types
- (7) An economic rollover was performed to determine the most economically efficient allocation and schedule which corresponds to the water yield levels (acre-feet) for each of the first five periods as defined in the Maximum Water run

The specifications for this rollover were as follows,

- (a) Objective Function, Maximize PNV for 10 periods,
- (b) Timber policies were the same as above,
- (c) Land base was the same as above,
- (d) Economic assumptions were the same as above,
- (e) All regionally defined MMRs were applied as above,
- (9) Output constraints Meets the water yield outputs (acre-feet) for each of the first five periods as defined by the maximum water run,
- (g) Activity constraints were the same as above

3. MKV - Maximum PNV-Market Values Only Benchmark

a Description and Purpose

Appendix B- The Modeling and Analysis Process

- (1) Used to estimate the mix of resource uses and a schedule of outputs and costs which would maximize the PNV of those outputs that have an established market price Dollar values were based on actual or simulated market prices (willingness to pay) for timber, range, commercially used fish, and developed recreation Used the same dollar values as other runs
- (2) Outputs were compared to Maximum PNV assigned with the MMR run to provide proportional differences in PNV and outputs. Proportions were used to estimate the differences between assigned and market values in subsequent runs

b Specifications

- (1) Same as Maximum PNV assigned with MMR run except used market values only (timber, range, developed recreation, and commercial fish).
- (2) The solution was run through the FORPLAN report writer to price out all assigned values The PNV-COST values from the second report were used to make comparisons.

4. MLV - Minimum Level of Management Benchmark

- a Description and Purpose Used to estimate outputs and cost of the backgrounds or residuals Minimum level is an accounting analysis to determine the background outputs and fixed costs associated with maintaining the Forests. It was used as a base to compare other alternatives It is not stewardship or custodial management

b Specifications

- (1) Objective Function Minimize cost for the planning horizon (16 decades)
- (2) Output Constraints
 - (a) Only background or incidental outputs were allowed,
 - (b) Timber, range, and developed recreation outputs were set at zero

c Other Assumptions

- (1) Vegetation would follow natural succession Habitat capability for MIS requiring late seral stage habitat would increase over time Habitat capability for indicator species requiring early seral stage habitat would decrease over time

Appendix B - The Modeling and Analysis Process

- (2) Only maintenance of those facilities that are needed to support the basic ownership activities would be allowed. All other facilities would be allowed to deteriorate.
 - (a) State and County roads would remain open but most Forest roads would be closed
 - (b) All public and private sector recreation facilities on National Forest lands would be closed, with no provisions for maintaining such assets
- (3) The fire organization would be greatly reduced. Forests would assume costs for detection and initial attack (engines) only, no other fire management and/or cooperators resources were considered
- (4) Recreation use assumptions - Dispersed recreation use that cannot be discouraged or controlled would occur

5. MMR - Minimum Management Requirements Benchmark

a Description and Purpose

- (1) Used to define and evaluate MMRs
- (2) Used to show the opportunity cost of MMRs taken collectively
- (3) Used to form the basis for evaluating constraints
- (4) Used to estimate the mix of resource uses and a schedule of outputs and costs which would maximize the PNV of those outputs that are assigned a monetary value. Dollar values were based on actual or simulated market prices (willingness to pay) for timber, recreation, range, water, wildlife, and fish

b Specifications

- (1) Objective Function Maximum PNV for 12 periods (decades)
- (2) Timber Policies
 - (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,
 - (b) Includes sustained yield requirements,
 - (c) Includes nondeclining yield requirements,
 - (d) Includes dispersion

- (3) Land Base Includes all tentatively suitable land
- (4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs
- (5) All MMRs were applied

6. RGN - Range Maximization Benchmark (for Five Periods [50 years])

a Description and Purpose Used to define maximum capability of the Forests to provide commercial livestock grazing over the RPA planning horizon subject to MMRs

b Specifications

- (1) Objective Function Maximum livestock forage for five periods (decades)
- (2) Timber Policies
 - (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,
 - (b) Includes sustained yield requirements,
 - (c) Includes nondeclining yield requirements,
 - (d) Includes dispersion
- (3) Land Base Includes all tentatively suitable land
- (4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs
- (5) All MMRs were applied
- (6) Activity Constraints The range activities provided for
 - (a) Type conversion to grass of selected chaparral lands not capable of growing 20 cubic feet of timber per acre per year. About 42,000 acres were included
 - (b) Type conversion to grass of selected chaparral lands on suitable timber lands. About 25,000 acres were included
 - (c) Full development of water, fencing, etc., to permit full utilization of available forage
 - (d) Grazing in wilderness
 - (e) Intensive harvesting of timber lands to provide high levels of transtory range
- (7) An economic rollover was performed to determine the most economically efficient allocation

and schedule which corresponded to the forage production levels head months (HMs) for each of the first five periods as defined in the Maximum RGN run

The specifications for this rollover were as follows.

- (a) Objective Function. Maximum PNV for 10 periods,
- (b) Timber policies were the same as above,
- (c) Land base was the same as above,
- (d) Economic assumptions were the same as above,
- (e) All MMRs were applied as above,
- (9) Output constraints Meets the forage outputs (AMs) for each of the first five periods as defined by the Maximum RGN (14RGN) run,
- (g) Activity constraints were the same as above

7. TBD - Maximize Timber Outputs for One Decade-Departure Benchmark

- a Description and Purpose Used to define the maximum timber output possible for the first decade with nondeclining yield policy removed and CMAI and MMRs retained
- b Specifications
 - (1) Same as TBR run below, except for removal of nondeclining yield (NDY)
 - (2) Land Base Includes all tentatively suitable land
 - (3) Economic Assumptions Same as TBR
 - (4) All MMRs were applied
 - (5) An economic rollover was performed as was the case for TBR Rollover specifications were the same as TBR

8. TBR - Maximize Timber Outputs Benchmark

- a Description and Purpose Used to define the maximum timber output possible for the first decade under current policy and MMRs
- b. Specifications
 - (1) Objective Function. Maximum timber for one period (decade)

Appendix B - The Modeling and Analysis Process

(2) Timber Policies

- (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,
- (b) Includes sustained yield requirements,
- (c) Includes nondeclining yield requirements,
- (d) Includes dispersion

(3) Land Base Includes all tentatively suitable land

(4) Economic Assumptions Used assigned values with trends and demand cut-offs for RVDs

(5) All MMRs were applied.

(6) An economic rollover was performed to determine the most economically efficient allocation and schedule which corresponded to the harvest levels for each of the five periods defined in the maximum timber run

The specifications for this rollover were the following

- (a) Objective Function Maximize PNV for 10 periods,
- (b) Timber policies were the same as above,
- (c) Land base was the same as above,
- (d) Economic assumptions were the same as above,
- (e) All MMRs were applied as above,
- (9) Output Constraint Meet timber outputs from each of the five periods as defined by the maximum timber run

9. WLN - Maximum Wilderness Benchmark

- a Description and Purpose Used to evaluate the impacts of maximum wilderness allocations.

b Specifications

(1) Objective Function Maximize PNV for 10 periods

(2) Timber Policies

- (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI;
- (b) Includes sustained yield requirements,

Appendix B - The Modeling and Analysis Process

- (c) Includes nondeclining yield requirements,
- (d) Includes dispersion
- (3) Land Base
 - (a) Includes all tentatively suitable lands
 - (b) All roadless areas designated for further planning were allocated to wilderness prescription. Boundary adjustments were not allowed. The Mt. Eddy roadless area was included.
- (4) Economic Assumptions Used assigned values with trends and demand cut-0% for RVDs
- (5) All MMRs were applied

N. Alternatives

This section lists only those constraints that were modeled in FORPLAN, it also describes how they were modeled. For a more complete discussion about the displays and results of all the alternatives refer to Chapter II. Chapter II lists all constraints unique to an alternative and Chapter IV discusses how those constraints change the environmental consequences.

Alternatives Eliminated From Detailed Study

I. ALTERNATIVE CEE - CONSTRAINED ECONOMICALLY EFFICIENT ALTERNATIVE

a Description and Purpose

- (1) Used to portray the most economically efficient mix of allocations and schedules, subject to meeting MMRs and MIRs
- (2) Used to specifically define and evaluate MIRs
- (3) Used to demonstrate the opportunity cost of the MIRs taken collectively
- (4) Used to form a base run used in evaluating the Forests' constraints common to all alternatives

b Specifications

- (1) Objective Function Maximize PNV for 12 periods (decades)
- (2) Timber Policies

- (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI:
- (b) Includes sustained yield requirements,
- (c) Includes non-declining yield requirements,
- (d) Includes dispersion
- (3) All MMRs and MIRs were applied. No additional Forest defined constraints were added
- (4) Land Base Includes all tentatively suitable land
- (5) Economic Assumptions Used assigned values with trends and demand cut-0% for RVDs.

2. Alternative CEF - Constrained Economically Efficient Alternative with Forest Constraints

a Description and Purpose

- (1) Used to portray the most economically efficient allocation and schedule, subject to meeting MMRs, MIRs, and Forest constraints common to all alternatives
- (2) Used to specifically define and evaluate the Forests' constraints common to all alternatives
- (3) Used to demonstrate the opportunity costs of the Forests' constraints common to all alternatives taken collectively
- (4) Used to form a base run used in evaluating other constraints and the Forests' alternatives

b Specifications

Same as Alternative CEE except. In addition to the MMRs and MIRs, the Forests' constraints common to all alternatives are included in this alternative.

3. Alternative LBU - 25 Percent Budget Reduction

a Description and Purpose Used to estimate the expected outputs and services that could be provided in the future if the current budget was reduced by 25 percent.

b Assumptions

- (1) Held as constant for the 50-year planning horizon, a 25 percent reduction in the normalized 1989 budget (see Alternative CUR direction). This 25 percent reduction applied to the total dollars.

c Specifications

- (1) Objective Function, Maximum PNV for 12 periods (decades).
- (2) Timber Policies
 - (a) Minimum rotation Used the full set of rotation ages greater than or equal to 95 percent of CMAI,
 - (b) Includes sustained yield requirements,
 - (c) Includes non-declining yield requirements,
 - (d) Includes dispersion
- (3) Land Base. Includes all tentatively suitable land
- (4) Economic Assumptions. Used assigned values with trends and demand cut-offs for RVDs
- (5) All MMRs and MIRs were applied The Forests' constraints common to all alternatives were also applied

4. Alternative MKT - Market Emphasis

Description and Purpose This alternative emphasizes high output levels of market resources such as timber, range, and minerals with non-market outputs at economically efficient levels

This required alternative is not measurably different than RPA, therefore, it was not run See alternatives considered in detail section, specifically the RPA alternative

5. Alternative PFD - Preferred Alternative/Departure

- a Description and Purpose Used to determine whether multiple-use objectives could be better met by regulating timber harvest volumes in a manner which deviates from the principle of Non-declining Yield (NDY)
- b Specifications Same specifications as Alternative PRF (Preferred Alternative) except for the following
 - (1) Objective Function Maximize PNV for 12 decades
 - (2) Non-declining Yield Applied only after the fifth decade
 - (3) Required to return to the Base Sale Schedule of Alternative PRF by the fifth decade

6. Alternative 12C - Late-Successional Forest Management

- a Description and Purpose This alternative emphasizes the protection of Old-growth reserves and watershed/fishery habitats as defined by the Scientific Panel on Late-Successional Forest Ecosystems
- b Specifications
 - (1) All specifications of the Preferred Alternative are applied to Alternative 12C
 - (2) In addition, old growth reserve categories 1 and 2 and owl additions are classified unsuitable
 - (3) The following constraints of the enhanced watershed/fishery habitat emphasis are included
 - (a) Intermittent streams 50A on each side with no harvest on moderate to high instability sites
 - (b) Class 3 streams (no fish bearing) 150-ft
 - (c) Class 1 & 2 streams (fish bearing) 300-ft on each side dedicated plus major corridors or flood planes 1/8-mi dedicated on each side
 - (d) Wild and Scenic Rivers 1/4-mi dedicated on each side
 - (e) On non-HCAs and Old-growth Reserve areas, preserve 6-green trees greater than the average stand diameter for future snags and dead and down
 - (f) No hot burns on steep areas and no burning in riparian areas
 - (g) Critical Watersheds are managed under a extended rotation of 180 years on all suitable timber acres

Alternatives Considered in Detail

I. Alternative PRF - Preferred Alternative

- a Description and Purpose. Alternative PRF portrays the Forests as being capable of supporting a sustained yield of commodity outputs, goods, and services Resources are managed within the requirements of multiple-use forest management Alternative PRF emphasizes a mixture of commodity production and amenity benefits that optimizes net public benefits (NPBs) while responding to local Forest issues

Appendix B - The Modeling and Analysis Process

b Speckations

(1) All MMRs, MIRs, and Forest constraints common to all alternatives were applied to this alternative

(2) The following timber policies were applied

(a) Sustained yield requirements,

(b) Harvest flow requirements,

(c) Non-declining yield,

(d) Dispersion rules, and

(e) Minimum rotations

(3) The objective function was to maximize PNV for 100 years (10 10-year periods)

(4) Constraints unique to this alternative

(a) Several allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints in order to respond to local Forest issues

• Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescriptions, over and above MMRs, MIRs, and forest constraints, include primarily the following areas

(1) portions of 5 roadless areas to semi-pnrmrative non-motorized,

(2) rural recreation on dispersed recreation sites, existing and potential ski areas, summer homes and special uses,

(3) 6 RNAs, and (4) non-stocked lands (i.e. brush, hardwoods, and knobcone pine)

• Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas

(1) foreground viewing area from developed recreation sites,

(2) foreground viewing area along scenic highways (Interstate 5 and Highways 3, 36, 89, 97, and 299 and the Everitt Memorial Highway.) and

(3) moderately unstable lands

A total of 102,240 acres of tentatively suitable timber lands was allocated

• Allocations of specified analysis areas to timber (TM-REG) prescriptions include primarily the following areas all other tentatively unsuitable land

A total of 427,760 acres of tentatively suitable timber lands was allocated

The net effect of all these allocations on the prescriptions in the Alternative PRF land base, when compared to Alternative RPA was as follows

TM-REG - Decreased by 110,976 acres from RPA

TM-MRG - Increased by 1,860 acres from RPA

Total tentatively suitable acres reduced by 109,116 as compared to RPA

(a) Rotations are at a minimum of 90 years and average 120 years

(b) The budget level for fire would increase by 100 percent above 1989 levels,

(c) Fifty percent of the dispersed, developed, and wilderness visitor days would be at low standard and 50 percent at high standard,

(d) Some use of herbicides would be allowed

2. Alternative RPA - 1990 RPA Program Emphasis

a Description and Purpose Under Alternative RPA, the primary objective is to schedule and harvest timber and to provide products and services at levels expected to help satisfy current and future demands (as stated in the 1990 Forest and Rangeland Renewable Resources Planning Act [RPA] program) This alternative determines how the Forests' RPA program can best be implemented

b Speckations

(1) All MMRs, MIRs, and Forest constraints common to all alternatives were applied to this alternative

(2) The following timber policies were applied

(a) Sustained yield requirements,

(b) Harvest flow requirements,

(c) Non-declining yield,

(d) Dispersion rules, and

(e) Minimum rotations.

- (3) The objective function was to maximize PNV for 100 years (10 10-year periods)
- (4) Constraints unique to this alternative. Only a few allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints'

- Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescriptions, over and above MMRs, MIRs, and Forest constraints, include primarily the following areas
 - (1) Rural recreation on dispersed recreation sites,
 - (2) one RNA,
 - (3) non-stocked lands (i.e. brush, hardwoods, and knobcone pine)
- Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas
 - (1) foreground viewing area from developed recreation sites,
 - (2) foreground viewing area along scenic highways (Interstate 5 and Highways 3, 36, 89, 97, and 299 and the Everett Memorial Highway.) and
 - (3) moderately unstable lands

A total of about 100,380 acres of tentatively suitable timber lands was allocated to this prescription

- Allocations of specified analysis areas to timber (TM-REG) prescriptions include primarily the following areas all other tentatively suitable lands

A total of 538,736 acres of tentatively suitable timber lands was allocated

- (a) No regeneration cutting can occur in deficit quarter townships according to the 50-11-40 rule. Thinning is permitted in all quarter townships on every acre meeting 11-40. Rotations are at a minimum of 90 years
- (b) The budget level for fire would increase by 100 percent above 1989 levels
- (c) Twenty-five percent of the dispersed, 70 percent of the developed, and 40 percent of the wilderness visitor days would be at low standard and the remaining visitor days at high standard

- (d) Some use of herbicides would be allowed

3. Alternative CUR - No Action/No Change

- a. Description and Purpose, Alternative CUR is the No Action/No Change Alternative required by National Forest Management Act (NFMA) regulations. This alternative represents a continuation of the current resource management direction based on Ranger District Multiple-Use Plans

b. Specifications

- (1) All MMRs, MIRs, and Forest constraints common to all alternatives were applied to this alternative
- (2) The following timber policies were applied
 - (a) Sustained yield requirements,
 - (b) Harvest flow requirements,
 - (c) Non-declining yield,
 - (d) Dispersion rules, and
 - (e) Minimum rotations
- (3) The objective function was to maximize PNV for 100 years (10 10-year periods)
- (4) Constraints unique to this alternative. Several allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints

- Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescriptions, over and above MMRs, MIRs, and forest constraints, include primarily the following areas

- (1) Rural recreation on dispersed recreation sites, existing ski areas, summer homes and special uses, and
- (2) non-stocked lands (i.e. brush, hardwoods, and knobcone pine)

- Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas

- (1) foreground viewing area from developed recreation sites.

Appendix B - The Modeling and Analysis Process

- (2) foreground viewing area along scenic highways (Interstate 5, Highways 3, 36, 89, 97, 299, and 24 Forest roads,) and
- (3) moderately unstable lands

A total of 133,011 acres of tentatively suitable timber lands was allocated

- Allocations of specified analysis areas to timber (TM-REG) prescriptions include primarily the following areas all other tentatively suitable lands

A total of 502,788 acres of tentatively suitable timber lands was allocated

The net effect of all these allocations on the prescriptions in the Alternative CUR land base, when compared to Alternative RPA, was as follows

TM-REG - Decreased by 35,948 acres from RPA
TM-MRG - Increased by 32,631 acres from RPA

Total tentatively suitable acres reduced by 2,317 as compared to RPA

- (a) No regeneration cutting is allowed in quarter townships not meeting the 50-11-40 rule. Thinning is permitted in all quarter townships on all acres meeting 11-40. Rotations are at a minimum of 90 years
- (b) The budget level for fire would be at current levels
- (c) One-hundred percent of the dispersed, 80 percent of the developed, and 100 percent of the wilderness visitor days would be at low standard and the remaining visitor days at high standard
- (d) Some use of herbicides would be allowed

5. Alternative CBF - Citizens for Better Forestry

a Description and Purpose Alternative CBF strikes a balance between resource use and resource restoration. This alternative emphasizes protection of RMZs, maintaining roadless areas in an undeveloped condition, maintaining older over-mature habitat, and emphasizing harvest systems other than clearcutting

b Specifications

- (1) All MMRs, MIRs, and Forest constraints common to all alternatives were applied to this alternative

- (2) The following timber policies were applied

- (a) Sustained yield requirements,
- (b) Harvest flow requirements.
- (c) Non-declining yield,
- (d) Dispersion rules, and
- (e) Minimum rotations

- (3) The objective function was to maximize PNV for 120 year (12 10-year periods)

- (4) Constraints unique to this alternative

- (a) Several allocations of land were made under this alternative beyond the MMRs, MIRs, and common Forest constraints

- Allocations of specified analysis areas to timber unsuitable (TM-UNS) prescriptions include primarily the following areas

- (1) 16 roadless areas to semi-primitive non-motorized,
- (2) Mt Eddy roadless area to wilderness,
- (3) Mt Shasta Scenic Area (Area A),
- (4) rural recreation on dispersed recreation sites. existing ski areas, summer homes and special uses,
- (5) 17 RNAs,
- (6) total RMZ width between 300 and 1,200 feet depending on slope, erosion hazard, and spotted owl corridors for perennial streams,
- (7) Trinity Divide Biolink. and
- (8) non-stocked lands (i.e. brush, hardwoods, and knobcone pine)

- Allocations of specified analysis areas to minimal timber (TM-MRG) prescriptions include primarily the following areas

- (1) Foreground viewing area from developed and dispersed recreation sites.
- (2) foreground viewing area along scenic highways (Interstate 5, Highways 97 and 299, Everitt Memorial Highway, and 5 Forest roads,)

- (3) moderately unstable lands:
- (4) Mt. Shasta Recreation Area,
- (5) N lands high site south and west aspect, and
- (6) A lands low site poorly stocked.

A total of 122,666 acres of tentatively suitable timber lands was allocated

- Allocations of specified analysis areas to (TM-REG) prescriptions include primarily the following areas all other tentatively suitable lands

A total of 372,750 acres of tentatively suitable timber lands was allocated

The net effect of all these allocations on the prescriptions in the Alternative PRF land base, when compared to Alternative RPA, was as follows

TM-REG - Decreased by 165,986 acres from RPA.
 TM-MRG - Increased by 22,286 acres from RPA

Total tentatively suitable acres reduced by 142,700 as compared to RPA

- (a) No regeneration cutting in deficit quarter townships according to the 50-11-40 rule Thinning is permitted in all quarter townships on all acres meeting 11-40 Rotations are set at a minimum of 120 years The regeneration system allowed is green tree retention (GTR) No clear-cutting is permitted
- (b) The budget level for fire would increase by 100 percent above current levels
- (c) Fifty percent of the dispersed, developed, and wilderness visitor days would be at low standard and 50 percent at high standard
- (d) No use of herbicides would be allowed.

O. Summary of Constraints Modeled in FORPLAN

The major types of constraints that were modeled in FORPLAN are summarized for each alternative in Table 6-11.

III. Other Models

In addition to FORPLAN, several other systematic models were used by the Shasta-Trinity National Forests These are described below.

A. Forest Plan Data Base

A new Forest Plan data base was developed in 1987. Sixty-thousand capability areas were defined based on land status, forest type, condition class, and National Forest group Additional information was coded into each capability area to assess public issues, define analysis areas, and determine acres of suitable prescriptions by alternative This data was loaded into a System 2K data base on a Univac mainframe at Fort Collins, Colorado

In 1988 the Forest Plan Data Base was migrated from the Univac at Fort Collins to the Data General system in the Supervisor's Office. It currently resides in Oracle on the Data General During 1990 the data base was updated to account for harvesting, planting, fires and land exchange as of January 1, 1990 As a result of these edits the data base currently contains 68,000 polygons Additional labels have been created most recently to help analyze issues pertaining to the Northern Spotted Owl and older over-mature habitat

The following attributes were coded for each capability area

Geographic locators

Yap Number
 Capability Area Number (polygon number)
 Net National Forest Acres (land status)
 Forest
 District
 Compartment
 Quarter township
 Slope
 Aspect

Cultural Resources

Cultural Sites

FORPLAN Analysis

FORPLAN Analysis Area
 Harvest regulation class by alternative

Riparian Areas

Inner Gorge Distance

Appendix B - The Modeling and Analysis Process

Table B-II
Constraints Imposed on Alternatives Considered in Detail

Modeling Feature	PRF	RPA	CUR	CBF
Objective Function	MAX PNV	MAX PNV	MAX PNV	MAX PNV
NDY*	Yes	Yes	Yes	Yes
Budget Constraint	No	No	No	No
33% Mortality	Yes	Yes	Yes	Yes
Unsuitable Lands	Yes	Yes	Yes	Yes
Herbicides	Yes	Yes	Yes	No
Riparian Mgt. Zones (minimum total width feet)** (allocation)				
Perennial Streams				
Class 1 Streams	600 TM-UNS	600 TM-UNS	600 TM-UNS	600 TM-UNS
Class 2 Streams	600 TM-UNS	600 TM-UNS	600 TM-UNS	600 TM-UNS
Class 3 Streams	300 TM-UNS	300 TM-UNS	300 TM-UNS	300 TM-UNS
Intermittent Streams				
Class 4 Streams	200 TM-REG	200 TM-REG	200 TM-REG	200 TM-REG
Lakes, Ponds, Reservoirs, and Wetlands				
Greater than One Acre	300 TMS-UNS	300 TMS-UNS	300 TMS-UNS	300 TMS-UNS
Less than One Acre	200 TMS-REG	200 TMS-REG	200 TMS-REG	200 TMS-REG
Goshawks	3000 TMS-UNS	30W TMS-UNS	3000 TMS-UNS	7500 TMS-UNS
Fire Program (percent)				
Budget Level	+100	+100	CURRENT	+100
Recreation Program (percent)				
Dispersed/low standard	50	25	100	50
Dispersed/high standard	50	75	0	50
Developed/low standard	50	70	80	50
Developed/high standard	50	30	20	50
Wildemerr (percent)				
Low Standard	50	40	100	50
High Standard	50	60	0	50
Management Intensity				
Minimum Rotation Regeneration in Deficit Quarter Townships (50-11-40)	90	90	90	120
Thinning on All Acres That meet 1140	No	No	No	No
	Yes	Yes	Yes	Yes
Prescription (Acres)				
TM-MRG	102,240	100,380	133,011	122,666
TM-REG <40%	213,413	234,983	216,274	160,452
TM-REG >40%	259,617	302,753	286,514	212,298

* NDY - Non-declining Yield

** Actual widths of RMZs are determined as specified under the Riparian Management Zone Standards and Guidelines (S&Gs) (See Chapter 4 of the Forest Plan for the complete set of S&Gs)

Inner Gorge Type
 Intermittent Stream Distance
 Perennial Stream Distance
 Perennial Stream Type

Soils
 Erosion Hazard
 Geologic Stability

Special Areas
 Research Natural Areas
 Special Areas

Threatened, Endangered, and Sensitive Species
 Habitat Conservation Area (HCA)
 Designated Conservation Area (DCA)
 Critical Habitat Unit (CHU)
 50-1 1-40
 Quarter Township category for 50-11-40

Vegetation
 Timber Productivity Class
 Timber Suitability for Regeneration
 Timber Strata (forest type and condition class)
 Vegetation Type
 Vegetation Size
 Vegetation Density
 Stand Record System number
 Year Planted

Visual Quality
 Visual Absorption Capability
 Visual Distance Zone
 Visual Variety Class
 Visually Sensitive Features

Wilderness and Roadless Areas
 Classified Areas
 Roadless Areas

Wildlife
 Big Game Habitat

See the planning record data base dictionary for Land Management Planning, June 1992, for more information about these attributes

B. Geographic Information System (GIS)

The 60,000 capability areas (polygons) were mapped in DWRIS87 (Distributed Wildland Resource Information System) a US Forest Service, Region 5, GIS product. This system resides on the Data General computer at the Supervisor's Office. The Forest set of digital maps, organized into the 19 quarter quads of the Forest, are linked to the Forest Plan Data Base to allow for area calculations and query mapping. The GIS was used to make timber suitability maps and calculate management prescription acres. It is also used regularly to overlay a variety of wildlife boundaries with the planning base maps to code polygons with new wildlife information and recalculate harvest regulation classes for alternatives.

C. Wildlife and Fish Habitat Relationships - Habitat Capability Models

The Wildlife and Fish Habitat Relationships System (WFHR) displays needs and/or habitat attributes of all known species which occur within a given geographical area or zone for breeding, feeding, resting and season of use by major habitat types and seral stages of those types. This information is shown on a series of matrices. The Shasta-Trinity National Forests' WFHR option includes the North Coast-Cascades Zone but does not include information for the species.

From the WFHR system a specific set of habitat capability models was developed for each of the Management Indicator Species (MIS) to display a classification of habitat attributes for preferred, moderate, and low levels of management. These models represent an aggregation of information from several sets of existing species capability models.

In addition to the matrices, the system includes range maps, pertinent life history narratives, scientific names, known habitat information, and references for information sources. This data base can be used to predict or provide species responses to habitat alteration, similar habitat use by more than one species, and habitat management needs.

D. Effective Alteration (EFFALT) Modeling

The EFFALT cumulative impact thresholds are applied in FORPLAN to limit timber harvesting activities and thereby assure that landscape alterations do not exceed the levels associated with desired visual quality objectives.

Appendix B - The Modeling and Analysis Process

(VQOs) Perspective plot computer simulations were the primary tool employed to establish these thresholds in the EFFALT approach. These simulations were developed (chiefly on Hewlett-Packard HP9845 hardware) by Forest Service landscape architects. The most critical and common situations modeled were mid-ground landscapes with partial retention VQOs. Topographic and timber stand data was fed into the computer to simulate current conditions. Varying rotation lengths and harvest entry rates were then tested by modeling all units into the perspective plots.

The resulting simulations of altered landscapes were then examined visually to determine maximum limits of alteration permissible under the given VQOs. Thus, the actual correlations of harvesting rates and total EFFALT to VQOs were based on the landscape architects' professional judgment. For similar situations, these judgments were highly consistent. They were further corroborated by field inspection and aerial photos compared to existing visual conditions (EVC) mapping.

References Cited

- 1 Johnson, K Norman, Brad Gilbert, Sarah Crim, FORPLAN Version II User's Guide, US Department of Agriculture, Forest Service, June 18, 1986, revised.
- 2 Haynes, Richard W, Kent P Connaughton, and Danus M Adams, Stumpage Price Projections for Selected Western Species, USDA Forest Service Research Note PNW-367, November 1980
- 3 U.S. Department of Agriculture, Forest Service, **An** Assessment of the Forest and Range Land Situation in the United States, January 1980, Washington, D C
- 4 US Department of Agriculture, Forest Service, Pacific Southwest Region, Pacific Southwest Regional Guide, January 15, 1984, revised
- 5 Forest Service Manual (FSM) 2472.03, R-5 Supplement No 232, May 1980
- 6 U.S. Department of Commerce, Bureau of Economic Analysis, Industry - Specific Gross Output Multipliers for BEA Economics Areas, January 1977

Appendix C

Roadless Area Descriptions and Evaluations

APPENDIX C

Roadless Area Descriptions and Evaluations

The purposes of this appendix are to (1) summarize the findings used in the evaluation of the Mt. Eddy Further Planning Area (RARE II #05229) for wilderness or non-wilderness allocations; and (2) disclose the proposed disposition for 29 roadless areas released by the 1984 California Wilderness Act

elevations Skiers would then be transported up to the skiing area.

Two major range allotments are located partially within the unit the Eddy Creek C&H and Bear Creek C&H allotments

1 Findings and Analysis, Mt. Eddy Further Planning Area (RARE II-#05229)

The proposed Mt. Eddy Research Natural Area (RNA), approximately 890 acres in size, is within this area

Wilderness Resource Values

A

Description

The Mt. Eddy area totals 9,846 acres, 2,126 of which are in private ownership. It is located on the Mt. Shasta Ranger District about seven miles west of Mt. Shasta City. It is located on the main divide between the Sacramento and Trinity River watersheds.

The following sensitive plants species are found on Mt. Eddy

Draba aureola Wats (DRAU)

Epilobium siskiyouense (Munz) Hoch & Raven (EPSI)

Eriogonum umbellatum Torr var *humistratum* Reveal (ERUMH)

The area is characterized by highly varied terrain ranging from level benches to nearly vertical slopes. Elevations range from 6,000 to 9,000 feet.

Wildlife and cultural resource values are characteristic to this physiographic province.

Capability

Vegetative types include grassy meadows, riparian zones, mixed conifer sawtimber, brushfields and subalpine tree species. The area contains the Sierran Forest Province-Mixed Conifer Forest ecosystem (M2610-5).

Wilderness Attributes

A number of alpine lakes are found within the area: Dobkins Lake, Durney Lake, Little Crater Lake, and Deadfall Lakes. These and other unpolluted water sources are of a high quality.

Natural integrity is high and apparent naturalness is moderately high. The only limiting feature of these attributes is the presence of roads around and partially within the area which provide access for a large number of hunters and fishermen. There are several unimproved roads leading to Little Crater Lake, Dobkins Lake, and Deadfall Lakes, and on Mt. Eddy itself. These intrusions are not separable through a boundary adjustment and would have to be obliterated if the area was designated for wilderness.

Evidence of past mineral development is present. Several prospecting sites for asbestos and chromite development are located within this area.

Opportunity for solitude is moderately high. It would have outstanding solitude except for two limiting factors: its small size and the presence of permanent off-site intrusions. It is a relatively untouched area completely surrounded by intensive management activities which take place on public and private land.

Recreation use (about 9,600 recreation visitor days [RVDs] annually) includes hiking, camping, rock climbing, swimming, fishing, hunting, horseback riding, and sightseeing. Portions of the area have been studied for downhill skiing. Preliminary studies indicate that the base facilities may have to be located at lower, generally nonskiable

The opportunity for primitive recreation is moderately high. The diversity of terrain and vegetation, the number

Appendix C - Roadless Area Descriptions and Evaluations

of lakes and streams, and the variety of wildlife tend to offset its small size when considering primitive recreation opportunities

Supplemental wilderness attributes (ecologic, scenic, etc.) include the aforementioned sensitive plants species, which make it a unique area for botanical study. As previously mentioned, a portion of the area has also been proposed for RNA establishment.

Manageability and Boundaries

Manageability could be enhanced by further adjustment of exterior boundaries. Nearly all the boundaries are located on unsurveyed land lines.

Also complicating manageability are the 2,126 acres in private ownership. These private lands contain desirable subalpine terrain and are distributed in such a manner that acquisition would be a key factor in improving manageability.

As mentioned previously, the overall small size of the area limits its suitability for wilderness designation. Any boundary adjustment which would further decrease size, would further diminish wilderness attributes.

Availability

The most significant potential use of this area, which would compete with wilderness designation, would be downhill skiing. This area has been inventoried for potential development of a downhill skiing facility with conceivably 60,000 RVs of use.

Potential hard rock mineral development also competes with wilderness values. Three prospecting sites for asbestos and one site for chromite development are located here.

Timber and forage values are insignificant and are not a factor in consideration for wilderness availability. The Mt. Eddy area contains an estimated 46.3 million board feet (MMBF) of standing sawtimber volume. Potential yields average 0.9 MMBF per year. There are about 3,400 acres of tentatively suitable timber lands, most of which exhibit low productivity for timber. Range use averages only 75 animal months (AMs) per year.

Recreation use consists primarily of dispersed camping, hiking, hunting, and fishing. Light, but steady, motorized

dispersed recreation use occurs within the area. The recreation use season is limited to six months a year because of access problems during the wintertime.

The large amount of private land limits availability. These lands would have to be acquired to best meet wilderness or downhill skiing objectives.

The presence of botanic values, as well as the proposal for a RNA, outwardly complements the wilderness values. However, the management and protection of these values would limit the availability of the area for wilderness because of the need to control dispersed recreation use.

Need

Although a majority of the people who responded during the 1987 Roadless Area Review and Evaluation (RARE II) public involvement analysis were pro-wilderness, a vocal minority was in favor of non-wilderness. The latter group was motivated by the then-active proposal for a downhill skiing development.

Mt. Eddy is the last remaining undeveloped subalpine area along the Eddy Range, other than have been logged and roaded. Recreation use has historically been limited to the summer months. New patterns of roaded motorized recreation have appeared as more jeep trails approach the perimeter of this area.

The potential wilderness opportunities in this area should be compared against those of its closest neighbor, Mt. Shasta, immediately across the valley and ten air miles away. The unique feature about Mt. Eddy, which is not present at Mt. Shasta, is the alpine lakes.

Alternatives Considered

B

Refer to **Table C-1** for land allocations (prescriptions) by alternative.

Under Alternative PRF (Preferred Alternative), the emphasis is on semi-primitive non-motorized and semi-primitive motorized recreation which appear to be in keeping with current and predicted recreation use trends. Under the Limited Roaded Motorized Recreation prescription (Prescription II), development of downhill skiing could be allowed if the need arose in the future.

Alternative RPA (1990 RPA Program Emphasis) emphasizes roaded natural recreation, with a small portion of the area allocated to timber management.

Alternative CUR (No Action/No Change) favors more semi-primitive motorized recreation than the other alternatives.

Alternative CBF (Citizens for Better Forestry) allocates the entire area to wilderness management and/or RNA establishment. Development of downhill skiing would not be considered under this alternative.

RNA allocations vary by alternative within this area. Under Alternative RPA (1990 RPA Program Emphasis) RNA establishment is not recommended. Alternatives PRF (Preferred Alternative), CUR (No Action/No Change), and CBF (Citizens for Better Forestry) have identified RNA values, and RNA establishment is recommended.

Environmental Consequences

C

Effects Due to Management Prescriptions

I. Designation Wilderness

Prescription: V - Wilderness Management

Alternative: CBF (Citizens for Better Forestry).

Wilderness designation under this prescription would maintain natural integrity, apparent naturalness, opportunity for solitude, and primitive recreation opportunity in the short and long run.

With respect to the effects on non-wilderness resources and uses, prohibition of all statutable or non-conforming practices would limit multiple use outputs and uses of this area.

Vegetation would be left to cycle naturally overtime. The total mix of wildlife assemblages and seral stages would be left to change primarily through natural processes.

Air quality would be maintained at a nondegradation level.

Grazing, where established, would continue on an extensive, rather than intensive basis. No fertilization, seeding of nonindigenous grasses, vegetative conversion, and/or water spreading would be allowed.

New mineral developments would be prohibited, assuming subsequent withdrawal of the area from mineral entry.

Recreation uses would be limited to primitive and, in some cases, semi-primitive non-motorized settings. Motorized dispersed recreation (off-highway vehicle [OHV] uses)

would be prohibited under this management prescription. Approximately 600 thousand RVDs of downhill skiing use would be foregone.

Virtual nondisturbance of soils and watersheds would enhance water quality and fishery habitats. A slight decrease in water yield would occur in the long run.

No timber harvesting or road construction would be allowed.

Visual resources would be enhanced with a visual quality objective (VQO) of preservation.

2. Designation: Non-Wilderness

Prescription: I - Unroaded Non-motorized Recreation

Alternative: PRF (Preferred Alternative)

This prescription would maintain (not diminish) components of wilderness quality in the short run. Long-term improvements in wilderness quality would take place pending improvements such as trails, number of primitive campsites, and trailhead facilities just outside the area.

Restriction of vegetative management to nonmechanical methods would cause slightly favorable impacts on older over-mature dependent wildlife habitats. Late seral stage habitats would be allowed to cycle naturally overtime with some assistance from prescribed burning.

Due to access and use of nonmechanical methods, opportunities to improve seral stage distribution, by prescribed burning, would be limited. In the long run, habitat values for early and mid-seral stage dependent species would gradually decline.

Air quality would be maintained at a nondegradation standard.

Grazing would continue on an extensive rather than intensive basis and would be coordinated with recreation use. Range improvement activities would be undertaken within the bounds of the adopted VQOs.

New and existing mineral developments would be allowed under plans of operation which provide for mitigation of soil and vegetative disturbances.

Recreation uses would be limited to primitive and semi-primitive non-motorized settings. Motorized, dispersed recreation (OHV uses) would be prohibited under this

Table C-1
Mt. Eddy Roadless Area
Land Allocations by Alternative (Percent of Acres)

Management Prescription ¹	Name	ALTERNATIVE ²			
		PRF	RPA	CUR	CBF
I	Unroaded Non-motorized Recreation	70	0	0	0
II	Limited Roaded Motorized Recreation	5	0	45	0
III	Roaded Recreation	15	80	5	0
IV	Roaded, High Density Recreation	0	0	0	0
V	Wilderness Management	0	0	0	100 ³
VI	Wildlife Habitat Management	0	0	20	0
VII	Late-successional Reserves and TE& Selected Sensitive Species	0	0	0	0
VIII	Commercial Wood Products Emphasis/Timber Management	0	20	20	0
IX ⁴	Riparian Management				
X	Special Area Management	10	0	10	0
XI	Heritage Resource Management	0	0	0	0

¹ These prescriptions are described in detail in Chapter II.

² PRF - Preferred Alternative

RPA - 1990 RPA Program Emphasis

CUR - No Action/No Change

CBF - Citizens for Better Forestry

³ Includes 10 percent in research natural areas.

⁴ All riparian areas will be managed according to Prescription IX. Acreages are not displayed because most acres are included in other more restrictive prescriptions.

management prescription. Approximately 60,000 RVDs of downhill skiing use would be foregone.

Nondisturbance of soils and watersheds would maintain water quality and fishery habitat. Water yield would decrease slightly in the long run.

Timber harvesting would be limited to catastrophic occurrences where salvage of the timber resource can be accomplished without road construction.

Visual resources would be maintained for a retention and/or a partial retention VQO.

3. Designation: Non-Wilderness

Prescription: II - Limited Roaded Motorized Recreation

Alternatives: PRF (Preferred Alternative) and CUR (No Action/No Change)

This prescription would maintain most of the components of wilderness quality in the short run. Construction of primitive roads and use of mechanized equipment could cause wilderness character to decrease slightly over the long term.

Restriction on vegetative disturbance to low impact stand maintenance salvage harvesting could facilitate development of older over-mature dependent wildlife habitats. Late seral stage habitats would generally be allowed to cycle naturally over time, with some assistance from prescribed burning.

Due to limited access, opportunities to improve seral stage distribution, through prescribed burning, would be reduced. In the long run, habitat values for early and mid-seral stage dependent species would gradually decline.

Air quality would be maintained at a nondegradation standard.

Grazing would continue on an extensive rather than intensive basis and would be coordinated with recreation use. Range improvement activities would be undertaken within the bounds of the adopted VQOs.

New and existing mineral developments would be allowed under plans of operation which provide for mitigation of soil and vegetative disturbances.

Recreation uses would be limited to semi-primitive motorized settings. Motorized, dispersed recreation (OHV uses) would be permitted under highly suitable trails and areas. Approximately 60,000 RVDs of downhill skiing could be realized should the demand develop.

Minimal disturbance of soils and watersheds would maintain high water quality. Water yield would decrease slightly in the long run. Fishery habitats would be enhanced.

Timber harvesting and associated road construction would be limited. Stand maintenance/salvage of dead, dying, or high risk trees would be the primary objective.

Visual resources would be maintained to meet retention and/or partial retention VQOs.

4. Designation: Non-Wilderness

Prescription: III - Roaded Natural Recreation

Alternatives: RPA (1990 RPA Program Emphasis), PRF (Preferred Alternative), and CUR (No Action/No Change)

Under this management prescription wilderness quality attributes would be moderately diminished. The character of the landscape would appear to be visually natural with obvious evidence of management including timber harvesting, road construction, and trailhead and other dispersed site construction.

Some mitigation on wilderness impacts could be done through intensity and timing of land management activities and visually screening developments using topographic and vegetative barriers. This area would be most beneficial to the recreationist seeking developed and less primitive opportunities.

Vegetative management would be used in support of recreation objectives. These practices would favor most wildlife habitats, as they would bring about a diverse range of seral stage conditions. Basically, values for wildlife habitat would be maintained.

Air quality would be maintained.

Grazing would be managed at intensive levels in key and highly suitable forage resource areas where they do not conflict with recreation. Grazing would continue on an extensive level elsewhere. Mitigation of impacts on wilderness values would be made by adjusting on-off grazing seasons, timing livestock movement between ranges, and minimizing range structures.

Appendix C - Roadless Area Descriptions and Evaluations

New and existing mineral developments would be allowed

A full range of motorized and non-motorized recreation settings would occur. Some developed recreation would take place. Users would tend to concentrate near riparian areas (lakes, streams) and other natural attractions. Large areas, where no use or very light dispersed non-motorized use takes place, would be evident. Development of downhill skiing would occur if the need arose in the future.

Timber harvesting and associated road construction would focus on achieving recreation objectives. Timber yields would be less than the biological potential due to longer rotation lengths (120-140 years).

Existing VQOs would be enhanced in primary viewsheds and maintained elsewhere.

Water quality and fishery habitats would be maintained. Water yield would decrease slightly over the long term.

5. Designation: Non-Wilderness

Prescription: VI - Wildlife Management

Alternative: CUR (No Action/No Change)

Under this management prescription wilderness quality attributes would be moderately diminished. Forest vegetation would be managed to maintain or enhance wildlife habitat.

Remnants of natural integrity and apparent naturalness could exist. However, land management activities would be evident. Mitigation of impacts on wilderness values could be accomplished through increasing the time intervals between or intensity of management activities and/or visually screening developments using topographic and vegetative barriers.

Vegetative management would be applied to meet a wide range of seral stage requirements. In general, early, mid, and late-seral stage habitats would be maintained. No decline in viability for animal species would be anticipated.

Air quality would be maintained.

Grazing would be managed at intensive levels in key and highly suitable forage resource areas where it does not conflict with wildlife browse/forage resources. Grazing would continue on an extensive basis.

New and existing mineral development would be allowed.

A full range of motorized and non-motorized recreation settings, including developed recreation, would occur. Users would tend to concentrate near facilities (campgrounds, trailheads) which would be used as a base of operations for enjoying a wide variety of roaded natural recreation pursuits. There would be large voids where no activities occur or where only primitive recreation use takes place. Development of a downhill skiing facility would not be recommended under this prescription.

Timber harvesting and associated road construction would focus on meeting wildlife habitat management objectives. This would result in timber yields which are less than the biological potential due to longer rotation lengths (120-140 years).

VQOs would be partial retention and/or modification, depending on wildlife needs.

Water quality and fishery habitat would be maintained. Water yield would decrease slightly over the long term.

6. Designation: Non-Wilderness

Prescription: VIII - Timber Management

Alternatives: RPA (1990 RPA Program

Emphasis), and CUR (No Action/No Change)

All wilderness attributes would be diminished in areas subject to this prescription. Evidence of vegetation management would appear less natural on the landscape. Only those portions of the area not suitable for timber management and/or other commodity uses would remain undeveloped. However, this area is too small or narrow to appear primitive.

A full range of vegetative manipulation measures would be available, but they would tend to favor early seral stage dependent wildlife.

Air quality would be maintained in the long run. There would be brief, temporary periods of air quality degradation during timber harvesting, road construction, and log hauling.

Grazing would be managed at intensive levels in key and highly suitable forage resource areas where they do not conflict with intensive timber management objectives. Grazing would continue on an extensive rather than on an intensive level elsewhere in the area.

New and existing mineral development would be allowed

A full range of motorized and non-motorized recreation settings would take place in this area. Roaded natural and rural recreation rather than primitive and semi-primitive situations would predominate.

Timber stands would be managed through stocking control measures with rotation lengths ranging from 70 to 130 years.

Visual resources would meet adopted VQO levels which, in most instances, would be modified. Some maximum modification could occur.

Assuming intensive application of Best Management Practices (BMPs), water quality and fisheries habitats would be maintained. Water yields would increase slightly.

7. Designation: Non-Wilderness
Prescription: IX - Riparian Management
Alternative: All alternatives

This prescription occurs in long, narrow corridors along streams or around bodies of water. Therefore, effects on wilderness would be influenced primarily by the prescriptions adjacent to the riparian areas. Management within the riparian areas would have little effect on wilderness values.

Under this prescription, there would be some latitude to use vegetation management to meet wildlife, fisheries, and water quality management objectives. In general, late seral stage dependent wildlife species would be favored at the expense of early seral stage dependent wildlife species.

Air quality would be dependent on activities in other prescription areas.

Grazing would be managed at intensive levels on highly suitable forage areas where it does not conflict with riparian management objectives.

New and existing mineral development would be allowed, based on plans of operation which clearly provide for mitigation of water quality degradation and soil and watershed disturbances.

A wide range of recreation activities and settings would be anticipated. Recreation uses would tend to concentrate along riparian areas where major attractions are located.

Motorized and non-motorized forms of dispersed and developed recreation use would occur. OHV use would be confined to designated roads and trails.

Timber harvesting and associated road construction, where allowed, would be directed toward meeting riparian management objectives. Timber yields would be much less than full biological potential and not scheduled at all along Class I, Class II, and Class III streams.

Existing inventoried VQOs would be maintained.

Water quality and fishery habitats would be enhanced with little or no effects on water yield over the long run.

8. Designation: Non-Wilderness
Prescription: X - Special Areas (Research Natural Areas - [RNAs] and Special Interest Areas - [SIAs])
Alternative: All alternatives except RPA (1990 RPA Program Emphasis)

This prescription would enhance natural integrity and apparent naturalness. Because of the research purposes, primitive recreation would not be encouraged in RNAs. Primitive recreation is encouraged in SIAs.

The opportunity for solitude would be enhanced. Primitive recreation opportunities would be limited by research objectives in RNAs but not in SIAs.

Prohibition of vegetative management would cause short-term favorable impacts on older over-mature dependent wildlife habitats. Late seral stage habitats would be allowed to cycle naturally over time. Conversely, early to mid-seral stage dependent wildlife habitats would decline in value.

Air quality would be maintained at a non-degradation level.

Grazing, where established, would continue on an extensive basis provided that conflicts with research purposes are minimized. No intensive grazing practices (e.g., fencing, fertilization, seeding, vegetative conversion, water spreading, etc.) would be allowed.

New mineral development would be prohibited, assuming subsequent withdrawal of the area from mineral entry. Established mineral rights would be managed under plans of operation which would minimize disturbances to the vegetation.

Appendix C - Roadless Area Descriptions and Evaluations

Recreation uses would be limited to primitive and semi-primitive non-motorized settings. Motorized dispersed recreation (OHV uses) and downhill skiing would be foregone.

The risks of disturbance to soils and watersheds would be decreased with decreases in water yield in the long run.

No timber harvesting and associated road construction would be allowed. Road and/or trail construction would be limited to RNA/SIA needs.

Visual resources would be natural in appearance. Areas would be managed to meet a VQO of preservation.

Synergistic Effects of Alternatives

1. Alternative PRF (Preferred Alternative). Impacts of this alternative on wilderness values would be relatively low. Eighty-five percent of the area is allocated to Prescriptions I (Unroaded Non-motorized Recreation), II (Limited Roaded Motorized Recreation), or X (Special Area Management). These prescriptions would retain most wilderness attributes.

The remaining 15 percent of the area would be allocated to Prescription III (Roaded Recreation). These prescriptions would affect wilderness values in a small portion of the area.

2. Alternative RPA (1990 RPA Program Emphasis). Under this alternative, the majority of the area would be allocated to Prescription III (Roaded Recreation) and Prescription VIII (Timber Management) which would substantially modify the wilderness attributes. This alternative would allow motorized recreation and timber harvesting. Visual resources would be maintained at the present inventoried VQOs on about 80 percent of the area.

3. Alternative CUR (No Action/No Change). This alternative would allow resource development, including timber harvesting and wildlife habitat manipulation, on 45 percent of the area. The remaining area would generally retain most of its wilderness character under Prescription II (Limited Roaded Motorized Recreation), and Prescription X (Special Area Management).

4. Alternative CBF (Citizens for Better Forestry). Under this alternative, the entire area would be allocated to Prescriptions V (Wilderness Management) and X (Special Area Management). These prescriptions would maintain the wilderness character.

Motorized recreation and use by OHV users would be prohibited. Visual quality objectives would be preservation.

II. Land Management Disposition Proposed for Roadless Areas Managed for Non-wilderness Under the 1984 California Wilderness Act

General Discussion

The 1984 California Wilderness Act allowed for non-wilderness multiple-use management of 29 individual roadless areas. (Refer to the wilderness and inventoried roadless areas map in the map packet for the location of these areas.)

These roadless areas, totalling 306,060 acres of National Forest land, would be subject to varying degrees of resource development activities depending on the themes of the four alternatives considered in detail in this Draft EIS and the mix of Management Prescriptions applied to them. There are 10 Management Prescriptions considered in the land allocation for each of the 29 released roadless areas. They are:

- I Unroaded Non-motorized Recreation
- II Limited Roaded Motorized Recreation
- III Roaded Recreation
- IV Roaded, High Density Recreation
- VI Wildlife Management
- VII Threatened, Endangered, and Selected Sensitive Species
- VIII Timber Management
- IX Riparian Management
- X Special Area Management
- XI Cultural Resource Management

These prescriptions are described in Chapter II.

Descriptions of the 29 released roadless areas follow.

Description of Released Roadless Areas

I. Backbone: 9,916 acres

This area is located immediately adjacent to (and west of) Shasta Lake. Over 25 percent of the area is in private ownership. Elevations range from 1,200 feet along the

shoreline to over 4,500 feet on the ridges adjacent to Schell Mountain. Vegetation consists of predominantly mixed conifer within the southern third of the area. The remainder is a diverse mixture of live and black oak, digger pine, and manzanita. One developed recreation site (e.g., Gooseneck Cove) receives light to moderate use. There is very little dispersed recreation use in the rest of the area (usually fishing). A small portion of the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA) is within this area.

2. Bell-Quinby (B): 11,707 acres

This area is located approximately six miles north of Burnt Ranch on the west side of the New River drainage. It is almost entirely surrounded by roads and is bounded on the north by the Trinity Alps Wilderness. The area is extremely rugged and steep with elevations ranging from 1,380 feet along New River and Quinby Creek to 5,864 feet at the north end of the unit. Vegetation ranges from mixed conifer species on the north slopes to brushfields and hardwoods on the south slopes. Present recreation use centers around hiking along a jeep and foot trail that runs through the unit.

3. Bonanza King: 16,306 acres

This area has been substantially roaded since the RARE II roadless inventory. A large portion of the area is in private ownership. It is located about five miles north of the Trinity Unit of the NRA. Elevations range from 2,500 feet along the Trinity River to 7,000 feet along the Bonanza King divide. Terrain is steep and rugged and nine perennial streams originate in the area. Vegetation consists of mostly manzanita within the western one-third. Mixed conifer and ponderosa stands occur at lower elevations within the rest of the area. Existing habitat supports populations of deer and small game. Trails follow the East Fork of the Trinity River and access Grouse Lake. The area receives moderate recreation use which consists of hunting, fishing, and other non-motorized dispersed use.

4. Castle Crags (B): 1,732 acres

This area is located about 8 miles southwest of Mt. Shasta City and 50 miles north of Redding. It adjoins the Castle Crags Wilderness. Elevations range from 5,600 to 6,600 feet. Terrain is mountainous with some sheer rock cliffs. Vegetation consists of large brushfields with scattered mixed conifers in the draws. Three alpine lakes are present. Access into the area is provided by only a few trails. A portion of the Pacific Crest Trail (PCT) is located along the southern boundary. Opportunities for primitive recreation are moderately high.

5. Chanchelulla: 3,865 acres

This area is located approximately 10 miles southeast of the community of Hayfork adjacent to the Chanchelulla Wilderness. Elevation ranges from 2,700 feet near the East Fork of Hayfork Creek to about 5,000 feet in the southeast corner along the Wilderness boundary. Vegetation consists of extensive brush fields on south-facing slopes and mixed conifer on north-facing ones. Significant commercial timber stands are found in the area. The area contains deer habitat. There are some trails in the area. Present dispersed recreation use is very low and occurs primarily as fishing.

6. China Springs (B): 707 acres

This area is located approximately 14 miles north of Junction City. It is contiguous to the Trinity Alps Wilderness. Elevations range from 2,500 feet to 4,000 feet. Vegetation consists primarily of mixed conifer forests. Chaparral and oak types occupy some of the more exposed, south-facing slopes. The western boundary of the unit is formed by a road system that winds its way up the steep ridge leading to China Springs. Short sections of spur roads, hiking trails, water developments, and miners cabins sprinkle the landscape at the edges of this area. Dispersed recreation use presently occurring within the area consists of a small amount of hiking, fishing, and hunting.

7. Chinquapin: 21,520 acres

Older over-mature Douglas-fir forests blanket the rugged steep slopes of ridges and creek drainages in this area. Specimen sized chinquapins grow throughout the area. Seventy percent slopes and unstable soils are common. This area is located about 15 miles southeast of Forest Glen and Highway 36 and is more than a two-hour drive from Redding. Major tributaries to the South Fork Trinity River are found throughout the area. Water quality is high and unpolluted. The southwestern portion contains the highest elevations, culminating at 5,900 feet. Lack of vegetative diversity and steep terrain limit varied opportunities for primitive recreation. Present recreation use is moderate and confined mostly to the South Fork Trinity River water influence zone.

8. Cow Creek: 23,152 acres

This area is located about 30 miles west of Weaverville north of U.S. Highway 299. Elevations range from 5,255 feet at Ironside Mountain to 1,500 feet in the Trinity and New River canyons. Rock bluffs and steep talus slopes are predominant throughout the area. Vegetation consists of

Appendix C - Roadless Area Description and Evaluations

mixed conifer, oak, chaparral, digger pine, and manzanita. Present dispersed recreation use is confined along the Trinity River and New River. Fishing, rafting, hiking, and hunting occur within this corridor.

9. Devils Rock 13,896 acres

This area is located near the Pit River Arm of Shasta Lake, approximately 24 miles northeast of Redding. The limestone outcroppings are visually pleasing. The Shasta salamander, which inhabits the formations, and the sensitive plants within the area are the prime ecological features. Elevations are low, mostly 1,500 to 2,500 feet, with Brock Butte peak at 3,459. Recreation use is light and consists primarily of hunting big game and wild turkey. Three trailheads lead up three of the permanent creeks in the area.

10. Dog Creek 5,543 acres

The area has been substantially roaded since the RARE II roadless inventory. Over 15 percent of the area is in private ownership. It is located immediately west of the Sacramento River and about five miles north of Shasta Lake. Elevations range from 1,100 feet in the northeast corner of the area (adjacent to the Sacramento River) to 4,300 feet along the southern boundary. Characterized by steep slopes and rugged terrain, the area is heavily dissected by intermittent stream courses. Vegetation is predominately mixed conifer and pine forest with some areas of Douglas-fir-pine in the upper reaches of Little South Fork of Dog Creek drainage. Primitive recreation opportunities are very limited due to the area's small size and rather homogeneous landscape. Present and potential recreation use is light and is composed primarily of hunting and fishing.

11. Eagle 6,798 acres

The area has been substantially roaded since the RARE II roadless inventory. It is located approximately six air miles east of Big Bar and eight air miles west of Weaverville south of U.S. Highway 299. Elevations range from 1,700 feet near the north edge of the area near Hocker Flat to approximately 5,700 feet at the top of the ridge (in the vicinity of Squaw Creek). The area is characterized by rugged terrain and steep slopes. Five perennial streams are present. There are several human-made intrusions in this area. A timber access road system was constructed and timber was harvested in 1982 and 1983 by the private landowner within the area. Since the 1984 California Wilderness Act, additional timber access roads have been built. Hunting constitutes the majority of the current recreation use in the area.

12. East Beegum: 1,963 acres

This area is located about 3 miles south of the Platina Canyon on Highway 36 and 8 miles north of the Yolla Bolly Middle-Eel Wilderness. Land administered by the Bureau of Land Management (BLM) is immediately to the east. Elevations range from 1,700 feet on Beegum Creek to 4,900 feet at Little Red Mountain. Vegetation changes from brush types, such as chaparral and manzanita at lower elevations, to stands of mixed conifers at the higher elevations. The area provides winter range for deer. Recreation use is light and generally confined to the South Fork of Beegum Creek's water influence zone. Trailheads are located at two Forest Service developed camp sites, North Fork Beegum and Beegum Gorge. Trails run along the North Fork of Beegum Creek, and a few other hiking trails follow the ridge tops.

13. East Fork 5,195 acres

The northern boundary begins at the Rat Trap Gap Road (FH 35) at an elevation of 3,200 feet. It rises on the south side of the area and reaches a high elevation of 7,200 feet at the Yolla Bolly-Middle Eel Wilderness boundary. The East Fork of the South Fork of the Trinity River runs through the area. Primitive recreation is limited by lack of diversified terrain and vegetation. Vegetation consists of predominantly older over-mature mixed conifers south of the river with brush interspersed. Deer are common here.

14. East Girard 21,914 acres

This area has been substantially roaded since the RARE II roadless inventory. Over 30 percent of the area is in private ownership. It is located about 15 miles northwest of Montgomery Creek. More than 14 buttes and mountains, ranging from 3,900 feet to 5,300 feet in elevation, are present. At least six major tributaries to the McCloud River and Squaw Creek originate within the area. The north and northwest portions of the area are adjacent to the McCloud River. Mixed conifer stands cover the majority of the area, including some areas with a large amount of Douglas-fir. Live oak, black oak, and manzanita grow in pockets throughout the area. Opportunities for dispersed recreation are limited due to the absence of lakes, uniform topography, and vegetation. Recreation use is currently light, consisting mostly of fishing and hunting.

15. Fisher Gulch 4,412 acres

The area, whose chief value is wildlife habitat, water quality and scenic value, is located about 8 miles north of Junction City. From a topographic standpoint, the area consists of a series of 5 short northeast/southwest running ridges. These ridges are components of a major divide between the East Fork of the Trinity River and Canyon Creek watersheds. Elevations range from 2,600 feet to about 4,600 feet. The area contains a wide variety of mixed conifer, drier locations contain digger pine and shrub types which are extremely dense and impenetrable. Recreation use is hampered because of the dense brush and rugged terrain. Moderate use is generally concentrated around roads, trails and trailheads leading into the Trinity Alps. Indications of mineral development are exemplified by the mines in the East Fork of the Trinity River watershed located within and/or adjacent to this area. Extensive mineral development, yielding many tons of gold ore, occurred between 1882 and 1904.

16. Kettle Mountain: 4,865 acres

Minor roading has occurred in this area since the RARE II roadless inventory. Over 50 percent of the area is in private ownership. It is located about 5 miles northwest of Montgomery Creek. Elevations range from 1,400 feet along the Pit River to 3,600 feet on Kettle Mountain. Moderately steep slopes and very irregular, heavily dissected hillsides characterize the area. Vegetation is classified predominately as mixed conifer with areas of live and black oak interspersed on drier sites. A peregrine falcon territory has been identified north of the Pit No. 6 Reservoir. The apparent naturalness of the area is impacted most by road construction, logging, and the presence of the reservoir and its facilities. Dispersed recreation use is currently light, mostly in the form of deer hunting in the fall.

17. Little French Creek 11,227 acres

This area is adjacent to and bounded on the north by the Trinity Alps Wilderness. It is located north of the town of Big Bar and about 2 1/2 air miles from Weaverville. The area is characterized by rugged terrain and steep slopes. Vegetation consists of brushfields, hardwoods, and digger pine at lower elevations (1,400 feet) while the higher elevations (approximately 5,900 feet) support mixed conifer stands. Several major trails traverse the area providing a means of off-highway vehicle (OHV) use. This use is confined to primitive jeep trails along the tops of north-south ridges. The use, although light, is well established. The area is used as an entrance to the southern edges of the Trinity Alps Wilderness area.

18. Mt. Shasta (B): 2,958 acres

The area lies northeast of Mt. Shasta City. It joins the Mt. Shasta Wilderness on the north, west, and south. It is characterized by rugged terrain containing old lava flows. Elevations range from 4,400 to about 9,000 feet. Mt. Shasta frequently creates its own climate and wind flow which affects the Mt. Shasta (B) area. The area receives a high amount of dispersed camping and hiking use. Recreation use is concentrated in the Bunny Flat-Sand Flat area, a takeoff point for most hikers who climb Mt. Shasta. Snow play (nordic skiing and snowmobiling) is popular during the winter.

19. Murphy Glade: 1,018 acres

This area is adjacent to the Yolla Bolly-Middle Eel Wilderness. Elevations range from 5,600 to 7,200 feet near the ridges adjacent to the Wilderness boundary. Vegetation consists primarily of older over-mature Douglas-fir sawtimber. The area is used as a trailhead for access to the Wilderness. Present recreation use is extremely light.

20. Panther: 11,727 acres

Minor roading has occurred in this area since the RARE II roadless inventory. The area is located about 5 miles west of Big Bar and 22 miles west of Weaverville south of US Highway 299. Elevations range from 1,000 feet along the canyon of the main stem of the Trinity River to 5,200 feet at Monument Peak. Six perennial streams flow through the area. Vegetation consists of mixed conifer communities of Douglas-fir-ponderosa pine to the more typical communities composed of various mixtures of Douglas-fir, incense cedar, sugar pine, and ponderosa pine. Tanoak, digger pine, chaparral, and oak occur on the drier sites. Most of the recreation use occurs along the Trinity River in the form of fishing and rafting. Some hunting occurs along the southern edges of the area.

21. Pattison: 28,326 acres

This area is located 14 miles northwest of the Hayfork Valley. It is located equidistant from the Trinity Alps Wilderness to the north and the Yolla Bolly-Middle Eel Wilderness to the south. Elevations range from 1,650 feet along Hayfork Creek to more than 5,100 feet near Pattison Peak. Vegetation consists of large brushfields, mixed conifer timber stands, and true fir communities. At least one cultural site (an Indian village) is known to exist. The area provides habitat for some older over-mature dependent species as well as bear. Recreation is comprised mostly of

Appendix C - Roadless Area Descriptions and Evaluations

off-highway vehicle (OHV) use on numerous jeep trails and includes some hunting and fishing

22. Penney Ridge: 4,844 acres

The area joins the Yolla Bolly-Middle Eel Wilderness along one half mile of its eastern boundary. Penney Ridge is remote and environmentally similar to the adjacent wilderness. Elevations range from 3,000 to 5,400 feet with 70 percent slopes. In 1988 the Hermit Fire burned a large portion of the area, affecting vegetation conditions substantially. Natural regeneration and conifer planting have occurred throughout the fire-affected area. Vegetation is characterized by a mosaic of younger and older mixed conifer stands on north-facing slopes and oak grass openings and brushfields on south-facing slopes. No new roads were constructed during implementation of fire salvage activities. Recreation activities are limited to occasional hiking and hunting.

23. Salt Gulch: 6,657 acres

The area has been substantially roaded since the RARE II roadless inventory. It is located approximately nine miles southeast of the community of Hayfork. Elevations range from 2,800 feet near Hayfork Creek to over 4,300 feet. The area is generally situated on a large, highly dissected ridge which forms a divide between Salt Creek and Hayfork Creek. Vegetation consists of Douglas-fir-pine-mixed conifer forests on moist, north slopes, mixed conifer forests on the less moist, north-facing slopes, and woodland-chaparral on the south-facing, dry slopes of the unit. The area contains wildlife habitat for deer. Timber harvest has occurred in the area in the past. Present recreation use is low and consists mainly of fishing.

24. Slate Creek 6,616 acres

The area has been substantially roaded since the RARE II roadless inventory. It is located about 4 miles west of the Sacramento River and the town of LaMoine. Elevations range from 2,000 feet along Slate Creek near its confluence with the South Fork, to 4,200 feet on the western divide. The area is moderately steep, with rugged terrain and well dissected hillsides. Vegetation consists of mixed conifer-ponderosa pine stands with occasional patches of hardwoods, manzanita, and fir at higher elevations. A high degree of forest management, including timber harvest, has occurred in the last five years. Recreation use is currently light with the use being equally divided between hunting, fishing, dispersed camping, and OHV use.

25. South Fork: 17,261 acres

The area is located about 6 miles south of Hyampom Valley. Special features include Marble Caves, located about 1 mile north of Forest Glen near the extreme southern end of the area, and cultural sites consisting of an old Indian village. Approximately 10.5 miles of the South Fork of the Trinity River, located within this area, are designated as part of the National Wild and Scenic River System. Much of the area is covered with extensive brushfields with some mixed conifer timber on north-facing slopes. Elevations range from 1,600 feet along the river to 4,900 feet at the top of Bear Wallow Mountain. The South Fork supports a valuable anadromous fishery and contains valuable spawning habitats. The diversity in this area somewhat offsets the confinements of the steep topography. Recreation use is moderate to heavy in the river corridor. Hiking, camping, rafting, prospecting, and dispersed camping all take place, but fishing is the primary activity.

26 Underwood 3,219 acres

The area is about 27 miles west of Hayfork and lies within the South Fork of the Trinity River watershed. The majority of the area is within the Six Rivers National Forest. Underwood Mountain is a prominent topographic feature. Elevations range from 1,920 feet to over 4,000 feet. Vegetation consists of large brushfields and mixed conifer timber stands. Dispersed recreation use is limited to hunting.

27. Wells Mountain: 6,144 acres

The area has been substantially roaded since the RARE II roadless inventory. Over 35 percent of the area is in private ownership. It is located about 7 miles east of Hayfork. Elevation varies from 2,500 feet in the streams to over 5,000 feet at Wells Mountain. In general, the area is very steep and rugged and is characterized by mature dissected topography. Tributary streams feed into Carr Creek to the north and to Hayfork Creek on the south and west. Vegetation consists of mixed conifer species on the north slopes and extensive brushfields and hardwoods on the south slopes. Recreation use is extremely light within this area and is composed primarily of hunting and fishing.

28. West Beegum: 5,480 acres

The area is located about 3 miles south of Platina Canyon on Highway 36 and 8 miles north of the Yolla Bolly-Middle Eel Wilderness. Beegum Gorge is the outstanding

topographic feature. The northern edge of the area is formed by Noble Ridge while Little Red Mountain Ridge forms the southern boundary. A foot and horse trail follows main Beegum Creek and the North Fork and Middle Fork of Beegum Creek. Opportunities for primitive recreation, including fishing and hunting, are moderately low.

29. West Girard

34,892 acres

The McCloud River watershed forms the focus of West Girard. The McCloud River is classified as a world class trout stream. West Girard is located approximately 9 miles

south of the town of McCloud. This area is characterized by steep to very steep slopes with elevations ranging from 2,200 feet in river canyon bottoms to 5,600 feet near Tombstone Mountain. Vegetation consists of brushfields and mixed conifers. Wildlife include Rocky Mountain elk and wild turkey. Scientific interest is focused on limestone formations which occur in scattered locations throughout the area. Limestone formations near Tombstone Mountain contain several unexplored caves.

Table C-2 shows the disposition of each roadless area by alternative. It includes the area name, National Forest acreage, and the approximate percentage of each Management Prescription applied in each alternative.

Table C-2
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
1	Backbone	9,976	II	10	0	0	0
			III	20	30	35	25
			VI	60	35	5	40
			VII	5	<5	<5	<5
			VIII	5	35	60	35
2	Bell-Quinby(B)	1,707	VII	100	100	100	100
3	Bonanza King	16,386	II	<5	0	<5	0
			III	15	15	15	<5
			VI	45	35	25	70
			VII	5	0	0	0
			VIII	35	50	60	30
4	Castle Crags (B)	1,732	VI	0	0	0	15
			VII	90	90	90	85
			VIII	10	10	10	0
5	Chanchelulla	3,865	VI	5	5	5	5
			VII	95	95	95	95
6	China Springs (8)	707	VII	100	100	100	100
7	Chinquapin	21,520	I	0	0	0	10
			II	0	0	0	5
			VI	0	0	5	0
			VII	60	75	65	55
			VIII	15	25	20	5
			X	25	0	10	25
8	Cow Creek	23,152	I	<5	<5	5	<5
			II	10	10	5	10
			III	35	5	30	30
			VI	15	40	5	10
			VII	40	45	45	50
			VIII	<5	<5	10	<5
9	Devils Rock	13,896	I				
			II				
			III	0	20	20	<5
			IV	<5	<5	<5	0
			VI	35	25	0	<5
			VII	5	<5	<5	15
			VIII	5	55	45	<5
			X	30	0	30	30
10	Dog Creek	5,543	III	15	<5	<5	0
			VI	5	15	10	30
			VII	25	30	30	45
			VIII	55	55	60	25

Table C-2 (Continued)
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
11	Eagle	6,798	III	25	5	20	25
			VI	30	25	0	0
			VII	15	15	15	50
			VIII	30	55	65	25
12	East Beegum	7,963	I	80	0	0	90
			VI	5	80	80	<5
			VII	<5	<5	<5	<5
			VIII	10	15	15	5
			X	5	5	5	5
13	East Fork	5,195	I	0	0	0	60
			II	20	20	20	0
			III	0	0	5	<5
			IV	0	0	<5	0
			VI	0	0	<5	0
			VII	35	35	35	35
			VIII	45	45	40	5
14	East Girard	27,914	I	<5	<5	0	15
			II	0	0	0	<5
			VIII	25	45	35	30
15	Fisher Gulch	4,472	I	25	0	0	30
			III	0	0	30	0
			VI	5	25	0	0
			VII	70	70	70	70
			VIII	0	5	0	0
16	Kettle Mountain	4,865	II	40	0	0	0
			III	0	35	20	35
			VI	0	0	0	90
			VII	<5	5	5	5
			VIII	60	60	75	5
17	Little French Creek	11,227	I	0	0	0	40
			III	45	30	30	10
			VI	10	25	25	0
			VII	45	45	45	50
			VIII	<5	<5	<5	<5
18	Mt Shasta (B)	2,958	I	25	0	0	55
			III	55	70	80	10
			VI	0	0	0	15
			VII	15	15	15	15
			VIII	0	10	0	0
			X	5	5	5	5

Appendix C - Roadless Area Descriptions and Evaluations

Table C-2 (Continued)
Roadless Area Prescriptions by Alternative
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR	CBF
19	Murphy Glade	1,018	III	0	0	5	0
			VII	5	0	0	5
			VIII	95	100	95	15
			X	0	0	0	80
20	Panther	11,727	III	45	45	50	50
			VI	20	20	15	0
			VII	35	35	35	50
21	Pattison	28,326	I	55	30	0	70
			III	10	<5	30	<5
			VI	15	5	10	<5
			VII	15	15	15	15
			VIII	20	50	45	<5
			X	0	0	0	15
22	Penney Ridge	4,844	I	35	30	30	95
			VI	15	30	0	0
			VII	<5	<5	5	<5
			VIII	65	40	65	5
23	Salt Gulch	6,657	III	<5	0	0	0
			VI	5	5	10	10
			VII	95	90	90	90
			VIII	0	5	<5	0
24	Slate Creek	6,616	VI	0	0	20	15
			VII	50	50	50	50
			VIII	50	50	30	35
25	South Fork	17,261	I	70	35	15	80
			II	<5	10	<5	<5
			III	5	5	15	0
			VI	<5	5	10	<5
			VII	20	15	20	20
			VIII	10	30	40	<5
26	Underwood	3,219	I	0	0	0	95
			VI	70	5	50	0
			VII	0	0	0	<5
			VIII	30	95	50	5
27	Wells Mountain	6,144	III	35	35	35	35
			VI	45	5	65	60
			VII	20	0	0	5
			VIII	0	60	0	0
28	West Beegum	5,480	I	90	0	0	90
			III	10	0	5	5
			VI	<5	70	85	<5
			VII	<5	5	0	<5
			VIII	<5	30	10	5

Table C-2 (Continued)
Roadless Area Prescriptions by Alternative^a
(Percent of Area)

Number	Roadless Area	National Forest Acreage	Management Prescription	PRF	RPA	CUR^b	CBF^c
29	West Girard	34,892	I	20	10	0	30
			II	0	0	0	<5
			III	0	5	<5	0
			VI	20	10	<5	<5
			VII	60	60	60	60
			VIII	0	20	35	<5
			X	0	0	0	10

Appendix I

Economic Efficiency Analysis

APPENDIX D

Economic Efficiency Analysis

Conceptual Background

Present Net Value

Present Net Value (PNV) is the criterion used to maximize net benefits in planning benchmarks and alternatives for the Shasta-Trinity National Forests. For each alternative PNV is the difference between the discounted value of all priced outputs and all Forest Service management and investment costs over the analysis period. The priced outputs are those that are or can be exchanged in the market place. They include the value of forage, timber stumpage, commercial fish in streams, miscellaneous harvested products, increased water flow, in-the-ground minerals, and all recreation visitor days including those for wildlife, fishing, and wilderness experiences.

The alternatives are designed and analyzed to achieve the goals and objectives for priced outputs in a manner that achieves the greatest excess in the value of priced outputs in relation to their cost, while meeting all specified constraints and objectives for non-priced outputs. The alternatives are also designed to achieve the specified non-priced outputs and to meet constraints at the least cost. Thus, the PNV of each alternative estimates the value of the maximum attainable net benefits of priced outputs. It is the value of priced benefits realized in excess of all the Forest Service costs of producing priced outputs and non-priced outputs and meeting management constraints. PNV, therefore, is an estimate of the market value of the current forest resources after all costs of producing outputs and meeting constraints have been subtracted from the value of the expected flow of priced outputs.

Net Public Benefit

Net Public Benefit (NPB) is defined as the overall value to the nation of all outputs and positive effects (benefits) less all the associated Forest Service inputs and negative effects (costs) for producing those primary benefits, whether they can be quantitatively valued or not. Thus, NPB conceptually are the sum of PNV plus the full value of non-priced outputs. The full value of non-priced benefits is used because their cost of production has been accounted for in PNV. The non-priced benefits included here are (1) outputs such as threatened and endangered species maintenance or enhancement, (2) natural and scientific areas,

(3) cultural site reservations such as Indian religious sites and historical or anthropological sites, (4) visual quality, and (5) diversity objectives or air quality in excess of minimum management requirements. Minimum management requirements in this context are standards that must be met in the production of any or all outputs from the Forests. The minimum level, therefore, is a cost of production in the multiple use context.

Secondary or induced benefits and costs also result from National Forest management activities. These include local income and job effects on economic development of communities, net cost to taxpayers, price effects on consumers of forest products and other producers of those products, payments to communities in lieu of taxes, and subsidies to specific users of National Forest outputs. All these are distributive welfare effects of National Forest production. The foregoing distributive effects and impacts have been the object of national policy issues and discussions in both the Administration and the Congress. Because they are distributive effects, they are essentially questions of equity rather than efficiency, and they involve questions of who should get benefits and who should pay the costs. They cannot be assessed in the context of the efficiency criteria associated with the PNV and the NPB concepts.

Final EIS Presentation

The methodology, background, and results of the economic efficiency analysis that was conducted during the planning process is presented throughout this Final Environmental Impact Statement (FEIS). As a result, all of the major sections of this document, including those listed below, must be read in order to get a complete picture of the analysis that was conducted.

Appendix D - Economic Efficiency Analysis

Context	Reference
Discussion of how economic efficiency analysis was used in the process of developing alternatives	Chapter II, parts B and F
Outputs, total cost, and PNV for each of the benchmarks	Chapter II, parts C and F
Results of the constraint analysis and a comparison of the alternatives in terms of PNV This is the most comprehensive summary of the analysis results in this document	Chapter II, part F
Background information on economic conditions and their resource supply-demand situation for the Forests	Chapter III
How and why PNV of the alternatives differs	Chapter IV
Technical details of the modeling and analysis process including a description of basic estimates and assumptions on benefits, costs, and interest rates	Appendix B

Appendix C

Wild and Scenic Rivers Evaluation

APPENDIX E

Wild and Scenic Rivers Evaluation

Introduction

A

Public Issues

This discussion includes an analysis of resource trade-offs involved in the potential additions to the Wild and Scenic Rivers System. The Department of Interior completed a screening and evaluation of the inventoried rivers in the Nationwide Rivers Inventory in 1982.

In January, 1981, 106.4 miles of wild, scenic, and recreation rivers on the Shasta-Trinity National Forests were designated by the Secretary of Interior. This designation was made in response to a request by the State of California for additions to the system under provisions of the Wild and Scenic Rivers Act. No further analysis or study is needed for these rivers.

The following rivers have been identified for further study: (1) the McCloud River, generally located northeast of Redding, in Shasta and Siskiyou Counties, with its terminus at Shasta Lake, (2) the Sacramento River from Box Canyon Dam to Shasta Lake, (3) The upper Sacramento River above Box Canyon Dam, (4) Beegum Creek from the Forest boundary to the headwaters, and (5) the upper segments of the North Fork and South Fork Trinity River and Virgin Creek, located west of Redding in Trinity and Tehama Counties. The South Fork and North Fork Trinity River are the headwaters of the mainstem Trinity River, which is a tributary of the Klamath River.

In addition, based on public comments and recommendations, three other streams were evaluated: (1) Canyon Creek, from the headwaters in the Trinity Alps Wilderness to the confluence with the mainstem of the Trinity River, (2) Hayfork Creek, from 9 Mile Bridge to the confluence with the South Fork Trinity River, and (3) Squaw Valley Creek from the confluence of Cabin Creek to the confluence with the McCloud River.

The following public issues focus on the Wild and Scenic Rivers and other water courses on the Forests:

a. How should the Forests' vegetative resources be managed for ecosystem diversity? Special consideration would be given to providing habitats that main-

tain or enhance populations of threatened and endangered (T&E) species and viable populations of sensitive species and/or management indicators. (Public Issue #2)

There is public concern that a wide variety of ecosystems should be maintained on the Forests to specifically provide for the:

- 1 Maintenance and/or enhancement of habitats for Federally listed T&E species (plants and animals),
- 2 Maintenance and/or enhancement of habitats sufficient to provide for viable populations of all other existing species (plants and animals),
- 3 Maintenance and/or enhancement of the Forests' existing ecosystems and the biodiversity (plants and animals) associated with them, and
- 4 Maintenance and/or enhancement of special elements or components of these ecosystems (i.e., snags, down logs, cliffs, vegetative seral stages, etc.)

b. How should watersheds be managed to maintain or enhance water quality and fisheries? (Public Issue #6)

The Shasta-Trinity National Forests contain the headwaters of two important watersheds in the State: the Sacramento and Trinity Rivers. These watersheds provide high quality water that has a broad variety of uses, including that of supporting an important anadromous (salmon and steelhead) fishery.

c. How should the Forests supply water-oriented recreation facilities and opportunities to meet increasing demand? (Public Issue #12)

There is a statewide public need for additional water-oriented recreation activities. The Forests have the potential to supply most forms of water-oriented recreation; however, the current supply of support facilities will not meet estimated demand. Conflicts are occurring between different types of use.

d. How wide should riparian management zones (RMZs) be and what management activities should be allowed within them? (Public Issue # 13)

Forest management activities have the potential to affect water quality and the fisheries resource on the Forests. Timber harvesting, prescribed burning, and road construction near stream courses are of particular concern to many people, because these activities have a high potential for degrading water quality and fisheries habitat.

e. What river segments should be recommended for inclusion in the federal Wild and Scenic Rivers System? (Public Issue #20)

Portions of New River, the North Fork and South Fork of the Trinity River, and the Trinity River were added to the National Wild and Scenic Rivers System in 1981. Several other major rivers and streams on the Forests have the potential for Wild and Scenic River designation. This designation would maintain examples of pristine aquatic and riparian ecosystems and provide river-oriented recreational opportunities. There is concern that designation would restrict other management activities, such as timber harvesting, and adversely affect private inholdings.

Description of Rivers

B

Refer to maps in this appendix for the geographic location of each of the following rivers.

Beegum Creek

Beegum Creek forms the common boundary southwesterly and northwesterly of Shasta and Tehama Counties, respectively.

Main Fork From Round Bottom in Section 5 (T28N R10W) to the Forest boundary. Section 5 (T28N R9W)

South Fork From headwaters of South Fork, Section 36 (T28N R10W), adjacent to Forest Road 28N36 to the confluence of Middle Fork, Section 6 (T28N R9W)

Cultural/Historical Values. The drainage was used extensively by prehistoric Native Americans. During World War II several chrome mines were developed within the drainage, but they were abandoned at the end of the war.

Fisheries. The stream supports a population of native rainbow trout. Holding and rearing habitat for anadromous fisheries is found in the lower reaches of the

creek. However a waterfall located about three miles above the Highway 36 crossing prevents migration into the upper reaches of the stream.

Geology. The stream is free-flowing with numerous pools and riffles. In Beegum Gorge proper, the stream is incised in bedrock and is very rugged and scenic. Above Beegum Creek Campground, side slopes are primarily serpentinized soils but the stream channel is relatively stable. Elevations range from about 1,300 feet at the Highway 36 crossing to about 3,900 feet at Forest Road 28N10.

Land Ownership. Above the Highway 36 crossing, the stream flows through lands administered by the Bureau of Land Management, the U.S. Forest Service, and through a small portion of private property.

Management Activities. Local economies are dependent primarily on Federal and State programs, recreation, retirement, grazing, and hunter recreation.

Recreation. Due to limited access, recreation use in the drainage is light. There are a few opportunities for camping, picnicking, swimming, and fishing.

Socio-economic. The socio-economic focus is revenues generated from Federal and State employment, recreation, retirement, and revenues generated from timber harvest and cattle grazing allotments on Federal lands.

Vegetation. Vegetation along the proposed corridor is varied. At the lower elevations, it ranges from chaparral brushfields through stands of gray pine and oaks with associated brush species, and stands of Jeffrey pine. Stands of mixed conifer are at the higher elevations. Cottonwood, California laurel, and alder grow along the creek bottom and wet drainages.

Visual Quality. The entire drainage is classed as Variety Class B and Sensitivity Levels 3 and 4.

Water. Water quality is good.

Wildlife. Due to the wide variety of habitats, numerous wildlife species live in this drainage. The lower elevations are also important black-tail deer winter range.

Canyon Creek

Segment I, from the confluence with the mainstem Trinity River, near Junction City, to the trailhead at Ripstein

boundary, measures 15 miles in length. Segment 2, from the Trinity Alps Wilderness boundary to the headwaters, is 6.5 miles long.

Cultural/Historical Values. The area was used by prehistoric Indians. It also has evidence of historic gold mining.

Fisheries. Canyon Creek supports steelhead, salmon, and rainbow trout in Segment 1, and trout only in Segment 2.

Geology. Both segments meet the free-flowing condition. However, the lower segment has an old water diversion dam which has been partially removed. A history of mining has altered the streamcourse though much of the evidence was altered during the 1964 flood.

Land Ownership. Canyon Creek flows primarily through National Forest land. There are some small, scattered private parcels as well.

Management Activities. The local economy is based on timber harvesting, mining, and related support.

Recreation. The area has high dispersed recreation values with moderate amounts of hunting, hiking, fishing, and dispersed camping.

Socio-economic. Mining, recreation and timber production formed the socio-economic framework of the area in the recent past. Today, roughly half of the watershed is within the Trinity Alps Wilderness. Recreation, in the form of hiking, camping, fishing and hunting, is the dominant socio-economic activity.

Vegetation. The stream corridor supports mixed conifer and hardwood stands. Generally, the corridor is classified as moderate to highly suitable for timber management.

Visual Quality. The visual quality inventory classifies the corridor as Variety Class A and Sensitivity Level 1.

Water. Water quality is excellent.

Wildlife. A variety of wildlife lives in the area, including game species such as black bear, black-tailed deer, and many non-game species.

Hayfork Creek

The 14-mile segment of Hayfork Creek is located approximately 6 miles west of the town of Hayfork. The

study segment begins at a crossing known as 9 Mile Bridge and flows through a steep canyon with side slopes up to 70 percent.

Cultural/Historical Values. The drainage was heavily used by prehistoric Indians. The area also has evidence of an early history of gold mining.

Fisheries. Hayfork Creek supports steelhead, salmon, and inland rainbow trout. Overall, the steelhead and rainbow trout populations are moderate to high.

Geology. The creek is free-flowing with numerous pools and riffles. Drafting of water for irrigation in the Hayfork Valley contributes to low summer flows though this condition improves downstream as the number of tributaries increases. Portions of the streamcourse have reached bedrock and are rugged and scenic. Soils are generally highly erodible within the watershed. Earthflows are evident in several of the tributary watersheds.

Land Ownership. Hayfork Creek flows primarily through National Forest land. There are a few small, scattered private parcels.

Management Activities. The local economy is dependent on timber harvesting, mining, and related support.

Recreation. The area has moderate recreational values with light to moderate amounts of hunting, hiking, dispersed camping, and boating. Fishing potential is high for steelhead and trout.

Socio-economic. Mining and the harvest of timber provides the socio-economic focus in the area. Increasingly, however, social values emphasizing water quality, scenic and wildlife amenities are moderating the economic focus.

Vegetation. Both sides of Hayfork Creek support scattered stands of mixed conifer and hardwood. Generally the corridor is classified as unsuitable or low suitability for timber management on the south-facing slopes and moderate to high suitability on the north-facing slopes.

Visual Quality. The drainage is inventoried as Variety Class 4 and Sensitivity Level 2.

Water. Water quality is good during high and moderate flows. During low flows, water quality is questionable due to increased temperatures and associated algae growth. As tributaries with colder water merge with Hayfork

Appendix E - Wild & Scenic River Evaluation

Creek, the water quality improves. Quality is considered good below the confluence with Corral Creek even during low flow conditions.

Wildlife. Wildlife includes game species such as black bear, black-tailed deer, and many non-game species.

McCloud River (Upper and Lower)

The McCloud River is located northeast of Redding with headwaters near Deadhorse Summit in Siskiyou County. The first five mile segment has such a low flow that it is not recommended for inclusion in the Wild and Scenic Rivers System. It flows southwest with its terminus at Shasta Lake. The upper portion of this river flows through National Forest lands, with the remainder flowing primarily through private ownership.

Cultural/Historical Values. This entire drainage was heavily used by prehistoric Indian tribes. Numerous well preserved Indian village sites, remnants of late 1800 and early 1900 resorts, and early logging still remain along the river.

Fisheries. Excellent fishing opportunities exist along this segment. It is a premium trout stream, containing the habitat of the redband trout, bull trout (Dolly Varden), and the rainbow trout. The McCloud river rainbow trout has been transplanted all over the world. The McCloud River has been classified as a blue ribbon trout fishery.

Geology. The upper five mile segment of the river, starting at Deadhorse Summit, has a very minimal flow and no outstanding features. Beyond the initial five miles, the river meanders through a gently rolling, forested plateau with interspersed meadows and several popular campgrounds. The river descends into a heavily forested canyon below a series of picturesque waterfalls. Big Springs, a unique volcanic geologic feature, increases river flow below the falls.

Land Ownership. The Upper McCloud River flows primarily through National Forest land. About 15 miles of the 24 mile segment are on National Forest land. The Lower McCloud river flows primarily through private land with only about 6 miles of the 23 mile segment on National Forest land.

Management Activities. Timber harvesting and recreation are the primary uses which add to the economics of nearby communities and the region. The water is of prime importance for downstream power generation at Shasta

Dam, and for irrigation in the Sacramento Valley. Nationally significant fishing opportunities are also available, but public access is restricted by private land ownership.

Recreation. Recreation use has been light. There are excellent opportunities for development of camping and picnicking sites. The area is highly suitable for development of hiking and equestrian trails. In recent years there has been increasing interest in whitewater rafting. Fishing is popular but restricted, as are other potential activities, because of the private land ownership.

The Upper McCloud, from Lower Falls to McCloud Lake, is suitable for whitewater boating year-round due to heavy flows from adjacent springs. The Lower McCloud is suitable for whitewater boating for a month or two in the spring following winter snow melt. During this period of time, fishing is poor due to the high water levels.

Socioeconomic. The socio-economic emphasis within the McCloud River watershed includes timber growth and harvest, the protection and enhancement of certain pristine private lands, the production of hydroelectric power, and downstream irrigation. Recreation use is more of a perception of an opportunity rather than a reality because of access restrictions related to terrain and private land ownership.

Vegetation. Vegetation along the entire upper portion of the McCloud river is primarily of a mixed conifer type, with scattered manzanita in the dryer sites and openings. Willow and alder are found along the river bank.

Visual Quality. Usual quality within the foreground of this watercourse is Variety Class A. Some timber harvesting can be observed near the river from time to time, but most activity occurred earlier in the century. The entire segment has been classified as highly sensitive visual quality (Sensitivity Class I).

Water. Water quality in the McCloud River is generally good but is marginal for drinking without treatment. The large influx of groundwater at Big Springs increases the size of the river tenfold.

Wildlife. This river contains a multitude of wildlife that are associated with a mixed conifer forest. Black-tail deer, mule deer, and black bear are common sights along the river. There have been two sightings of wolverine. Bald eagles and various species of ducks can be seen in and adjacent to the water.

North Fork Trinity River

The North Fork Trinity River is located northwest of Weaverville in the western portion of Trinity County. The study segment begins in the Trinity Alps Wilderness along the Salmon Mountains and ends near the trailhead at Hobo Gulch.

Cultural/Historical Values. The area has an early history of gold mining with many relics of old townsites and cabins.

Fisheries. The river supports native trout and anadromous fisheries (salmon and steelhead).

Geology. This river is a free-flowing stream with numerous pools and riffles. The streamcourse is incised in bedrock and is very rugged and scenic. Side slopes are unstable, with large landslide areas along portions of the channel.

Land Ownership. This river is entirely within National Forest land.

Management Activities. The local economy is dependent on timber harvesting, tourism, and recreationists within the Trinity River drainage.

Recreation. The area has high recreational values with significant amounts of hunting, fishing, hiking, and camping occurring throughout the drainage.

Socio-economic. The North Fork Trinity River is primarily in the Trinity Alps Wilderness. The social-economic focus is mostly related to amenity wilderness values, although the economic value of the salmon and steelhead fisheries is significant.

Vegetation. Both sides of the river are heavily forested with stands of Douglas-fir. The soils are shallow and growing conditions are marginal.

Visual Quality. The entire drainage is classed as Variety Class A and Sensitivity Level 2.

Water. Water quality is good.

Wildlife. Numerous wildlife species live in the area including black-tail deer and black bear.

South Fork Trinity River

This river is located west of Weaverville and Hayfork in the southwest portion of Trinity County. The 25-mile study segment begins at the headwaters of the South Fork of the South Fork Trinity River in the Yolla Bolly-Middle-Eel Wilderness and ends at the Highway 36 bridge at Forest Glen.

Cultural/Historical Values. Several old homesteads can still be found; they provide good examples of lifestyles in the mid-1800s. Some prehistoric sites are evident. No thorough inventory of the drainage has been completed.

Fisheries. The river provides important habitat for anadromous fish. The South Fork Trinity has been identified as a Model Steelhead Stream Demonstration Project which demonstrates the compatibility of fisheries and resource management.

Geology. This gradually sloping river flows through extremely unstable areas. Large pool and riffle sections dominate the upper river. The lower river has rather wide floodplains and infilled pools as a result of the 1964 flood.

Land Ownership. The river runs primarily through National Forest land. Numerous small private land parcels are intermingled.

Management Activities. Local communities count on the revenues derived from timber harvesting, ranching, and recreation within this watershed.

Recreation. The river is used primarily for fishing, hunting, and camping. Several developed campgrounds and 11 summer homes are located in the area. The South Fork Trinity National Recreation Trail (NRT) parallels the river for nine miles.

Socio-economic. The South Fork Trinity River features diverse socio-economic factors featuring timber management, anadromous fisheries, ranching, and recreation. Conflicting social values are most often underscored by land use decisions, especially those related to timber management activities. The area is lightly populated but generates attention from environmental and industrial organizations far removed from its boundaries.

Vegetation. Both sides of this river support large stands of older over-mature Douglas-fir, except in areas close to old homesteads.

Visual Quality. The entire length of this river has been inventoried as Variety Class A and Sensitivity Level I

Water. A decline in water quality for anadromous fish habitat has resulted primarily from past natural events, such as the 1964 flood

Wildlife. Many species of wildlife live in the area. Black-tail deer, black bear, spotted owls, and bald eagles are common

Sacramento River (Segment 1)

The Sacramento River is located north of Redding. The portion under consideration begins at the Box Canyon Dam and flows south to a terminus at the boundary of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA)

Cultural/Historical Values. The entire drainage was heavily used by prehistoric Indians

Fisheries. The river is a premium stream for rainbow trout

Geology. The river is free-flowing below the Box Canyon Dam with numerous sequences of rapids and pools. Though an interstate highway, a railroad, and powerlines parallel the steep sided canyon walls, the heavily forested streambeds and rock outcrops screen the majority of obtrusive features and combine to form a very picturesque river corridor

Land Ownership. The Sacramento River flows through scattered public lands. Only about 6 miles of the 37 mile segment are on National Forest land

Management Activities. Transportation corridors and recreation are the prime uses which add to the economics of nearby communities. The water is of prime importance for downstream power generation at Shasta Dam and for irrigation in the Sacramento Valley. Nationally significant fishing opportunities are also available, but public access is limited by private land ownership

Recreation. Recreation use has been light to moderate. There are a few limited opportunities for camping and picnicking. In recent years there has been increasing interest in whitewater rafting. Fishing is popular but restricted because of very limited access

Socio-economic. The vast majority of the Sacramento River is in private ownership and, therefore, there is little socio-economic effect related to Forest Service land management decisions. The river canyon includes a major north-south highway (Interstate 5), a rail, and a power transmission line corridor through the Pacific Coast states from Washington to Southern California. The Sacramento River is one of the major rivers providing water resources for the California Central Valley Project, one of the largest power and irrigation projects in the world

Vegetation. Vegetation is primarily a mixed conifer/hardwood type, with scattered manzanita in the dryer sites and openings. Willow and alder are found along the river bank

Visual Quality. Visual quality within the foreground of the watercourse is Variety Class A. Some of the cut and fill banks for Interstate 5 and the railroad are evident for short durations. In addition, some of the railroad bridges constructed in the early 1900s are also evident. The entire segment has been inventoried as highly sensitive visual quality (Sensitivity Class I)

Water. Water quality in the Sacramento River is generally good but marginal for drinking without treatment. Highway spills and municipal sewage systems have caused periodic short-term pollution problems

Wildlife. This segment contains a variety of wildlife associated with the vegetation type. Black-tail deer and bear are common sights along the river. Bald eagles and various species of ducks can be seen in and adjacent to the water

Sacramento River (Segment 2 Upper Forks)

North Fork

Mileage six miles from the headwaters to South Fork Road

Cultural/Historical Values. The area was used as a transportation corridor for prehistoric populations. The historic Sisson-Callahan National Recreation Trail (NRT) follows this drainage. Historic railroad logging occurred in this area during the first two decades of the 20th Century

Fisheries. The North Fork Sacramento River is an important water quality stream and contains a healthy population of inland rainbow trout

Geology. This segment is free-flowing to Lake Siskiyou, it has numerous pools and riffles. Streamcourses are incised to bedrock, moderately rugged, and scenic. Side slopes and channels are moderately stable. The entire watershed is underlain by ultramafic rock.

Land Ownership. The North Fork of the upper Sacramento River flows predominantly through National Forest land.

Management Activities. Most of the stream corridor falls within a habitat conservation area for the northern spotted owl. Activities include low to moderate timber harvesting, mining, and hiking along the Sisson-Callahan NRT.

Recreation. Most recreation use in this area is associated with the Sisson-Callahan NRT. Equestrian use, hiking, mountain biking, and hunting take place.

Socio-economic. Recreation, mining, and timber production represent the primary socio-economic values of the area. Current trends suggest that an increase in recreational activity is possible.

Vegetation. Mixed conifer stands dominate the stream corridor.

Visual Quality. Variety Class B with Sensitivity Levels 1-3.

Water. Water quality is good during high and moderate flows. Recreation use and grazing may affect water quality during low flows.

Wildlife. There is a variety of wildlife in the area including game species such as black bear, black-tailed deer, and many nongame species. Bald eagles and osprey are found adjacent to and above Lake Siskiyou.

Middle Fork

Mileage: 5.4 miles from Toad Lake to South Fork Road.

Cultural/historical Values. The area was used intensively as a transportation corridor for prehistoric populations.

Fisheries. The Middle Fork Sacramento River is an important contributor of good quality water to the South Fork Sacramento River. It supports a fairly good population of inland rainbow trout.

Geology. This segment is free-flowing to Lake Siskiyou; it has numerous pools and riffles. Streamcourses are incised to bedrock, moderately rugged, and scenic. Side slopes and channels are moderately stable. The entire watershed is underlain by ultramafic rock.

Land Ownership. The Middle Fork of the upper Sacramento River flows through National Forest land.

Management Activities. The area is characterized by moderate timber harvesting and minimal recreation development.

Recreation. This area offers excellent opportunities for hiking, dispersed camping, mountain biking, hunting, and backcountry skiing.

Socio-economic. Recreation and timber production represent the primary socio-economic values of the area. Current trends suggest that an increase in recreational activity is possible.

Vegetation. Mixed conifer stands dominate the stream corridor.

Visual Quality. Variety Class B with Sensitivity Levels 1-3.

Water. Water quality is good during high and moderate flows. Recreation use and grazing may affect water quality during low flows.

Wildlife. There is a variety of wildlife in the area including game species such as black bear, black-tailed deer, and many nongame species. Bald eagles and osprey are found adjacent to and above Lake Siskiyou.

South Fork

Mileage: 10.4 miles from Gumboot Lake to Lake Siskiyou (10.2 miles are National Forest land, 0.2 mile is private land).

Cultural/historical Values. This area was used intensively as a transportation corridor by prehistoric populations and probably served as a major connecting route between the upper Sacramento and upper Trinity watersheds.

Fisheries. The South Fork Sacramento River is an important water quality stream and contains brook trout and rainbow trout. The stream is stocked regularly during the summer with catchable rainbow trout.

Appendix E -Wild &Scenic Rven Evaluation

Geology. This segment is free-flowing to Lake Siskiyou, it has numerous pools and riffles. Streamcourses are incised to bedrock, moderately rugged, and scenic. Side slopes and channels are moderately stable. The entire watershed is underlain by ultramafic rock.

Land Ownership. The majority of the stream corridor is on National Forest land. There are small private land parcels at Cliff Lake and near Lake Siskiyou.

Management Activities. Recreation and timber harvesting represent the main activities in this area.

Recreation. This area represents a major recreation corridor. There is access to hiking, fishing, hunting, dispersed camping, Castle Crags Wilderness trailheads, the Pacific Crest National Scenic Trail (PCT), and numerous lakes along the Trinity Divide.

Socio-economic. Recreation and timber production represent the primary socio-economic values of the area. Current trends suggest that an increase in recreational activity is possible.

Vegetation. The stream corridor is characterized by mixed conifer stands.

Visual Quality. Variety Class B with Sensitivity Levels 1-3.

Water. Water quality is good during high and moderate flows. Recreation use and grazing may affect water quality during low flows.

Wildlife. There is a variety of wildlife in the area including game species such as black bear, black-tailed deer, and many nongame species. Bald eagles and osprey are found adjacent to and above Lake Siskiyou.

Squaw Valley Creek

This creek is located northeast of Redding, with headwaters in an alpine meadow. The first 10 miles of the upper segment, which terminate at the town of McCloud, have such a low flow that they are not recommended for inclusion in the Wild and Scenic Rivers System.

The next 9 mile segment, or middle segment, from McCloud to the confluence of Cabin Creek, traverses a rural residential and pasture land area. Again, since the flow is relatively low and there are no remarkably outstanding

features, this second segment is not recommended for inclusion in the Wild and Scenic Rivers System.

The lower segment travels 10.5 miles from the confluence of Cabin Creek to the confluence with the McCloud River.

Cultural/Historical Values. This entire drainage was used by prehistoric Indian tribes.

Fisheries. There are excellent native trout fishing opportunities along this segment.

Geology. The upper river is of low gradient. The middle and lower reaches are incised in bedrock and have interspersed pools and rapids.

Land Ownership. The lower segment flows through approximately 10 miles of public land and one-half mile of private land (located near the confluence with the McCloud River).

Management Activities. Timber harvesting and recreation are the primary uses which add to the economy of nearby communities. The water is important for recreation as well as downstream power generation and irrigation uses.

Recreation. Recreation use has been very light. Land access is available via cross-country hiking for the first 3.5 miles from the PCT bridge crossing just below the confluence of Cabin Creek. The next 7 miles are generally paralleled by a narrow dirt road with infrequent motorized use. At present, this road is not open to motorized use.

There are excellent recreation opportunities for public use. The area is highly suitable for most semi-primitive non-motorized and motorized recreation experiences. There are also some excellent opportunities for roaded natural recreation activities. Based on flow levels and current technology, the stream is only marginally suitable for whitewater rafting.

Socio-economic. Squaw Valley Creek is tributary to the McCloud River and the primary socio-economic interests are timber harvesting and recreation. Aesthetic and biological values strongly influence management decisions in the area.

Vegetation. Vegetation along this segment is primarily a mixed conifer type with scattered manzanita in the dryer sites and openings. Willow and alder are found along the stream bank.

Visual Quality. Visual quality within the foreground of this watercourse is Variety Class A. The entire segment has been classified as moderate visual sensitivity (Sensitivity Class II)

Water. Water quality in Squaw Valley Creek is generally good but marginal for drinking without treatment

Wildlife. This segment contains a multitude of wildlife that are associated with a mixed conifer forest. Black-tail deer and black bear are common sights along the creek. Bald eagles and various species of ducks can be seen in and adjacent to the stream

Virgin Creek

This 11-mile-long river is located within the Trinity Alps Wilderness. It is a tributary of New River, which is classified as a part of the National Wild and Scenic Rivers System. It is located on the western edge of Trinity County

Cultural/Historical Values. The area has a past history of early California gold mining

Fisheries. The river supports native trout and anadromous fish (salmon and steelhead)

Geology. The study area is in a primitive condition and includes a free-flowing stream with numerous small rapids, falls, and pools. It flows in a southerly direction beginning on the upper slopes of Salmon Mountain and terminating in the New River. The streamcourse is incised in bedrock and is quite rugged and scenic

Land Ownership. Land is in National Forest ownership

Management Activities. The local economy in the area has been dependent on timber, mining, recreation, and, in the past, illegal cannabis growing. Cannabis growing has decreased dramatically as resource management activities have increased

Recreation. Recreation activities in the Virgin Creek drainage have been restricted for the past few years due to illegal cannabis growing. Management efforts have eliminated this conflict, and the area is again open to the public. The primary recreation activities are fishing, hiking, and equestrian use.

Socio-economic. Virgin Creek is totally within the Trinity Alps Wilderness. The social-economic values are primarily

ly related to the amenities of a wilderness environment, i.e., solitude, scenic quality, wildlife, fish, etc.

Vegetation. Vegetation varies from dense Douglas-fir stands to open grass areas. Southerly-facing slopes have many outcrops of brush

Visual Quality. Visual resources include Variety Class A within the stream corridor and Sensitivity Level I

Water. Water quality is excellent. Old mining activities have had no long-term effect on water quality

Wildlife. Numerous wildlife species are present in the area including black-tail deer and black bear

Evaluation Criteria for River Eligibility

C

The rivers analyzed in this appendix were identified in the Nationwide Rivers Inventory (NRI) and through the land management planning process as being potentially eligible for designation as part of the Wild and Scenic Rivers System. The eligibility of a river is determined by testing it against the requirements of Section 2(b) of the Wild and Scenic Rivers Act, as supplemented by Guidelines for Evaluating Wild, Scenic, and Recreation River Areas Proposed for Inclusion in the National Wild and Scenic Rivers System, September 7, 1982.

A number of criteria is included in the Act and Guidelines. Among the most important are "free-flowing" and "outstandingly remarkable." These criteria were applied to the corridors of study rivers to determine the presence of any special values or features. Tables E-1 and E-2 describe these values and features for each study river.

An analysis was conducted in order to determine the eligibility/classification of each proposed wild and scenic river segment. Table E-3 depicts the results of this analysis.

Alternatives and Effects of

D Alternatives

Alternative PRF (Preferred Alternative)

Alternative PRF recommends classification of all or portions of six of the 11 study rivers. If approved by an Act of Congress, the free-flowing condition of these rivers would be assured. They include Beegum Creek, Hayfork Creek, North Fork Trinity River, South Fork Trinity River, Virgin Creek, and Canyon Creek. (See Table IV-19)

Appendix E - Wild & Scenic Rivers Evaluation

Beegum Creek -- extends from the Forest boundary above State Highway (SH) 36 to Beegum Gorge. It includes 2.5 miles of river on National Forest land. It becomes the Bureau of Land Management (BLM) designation south of the Forest boundary.

Hayfork Creek -- includes 14.0 miles of river. About 2.5 miles are within private ownership and 11.5 miles are within National Forest land.

North Fork Trinity River -- extends the existing wild and scenic river into the Trinity Alps Wilderness. It includes 11.7 miles of river, all within National Forest lands.

South Fork Trinity River -- extends the existing wild and scenic river to its headwater; It includes 26.3 miles of river. About 1.5 miles are within private ownership and 24.8 miles are within National Forest land.

Virgin Creek -- includes 11.7 miles of river, all of which are on National Forest land within the Trinity Alps Wilderness.

Canyon Creek -- includes 21.5 miles of river. About 4.0 miles are in private ownership and 17.5 miles are National Forest land.

Approximately 79.7 miles of river (National forest lands only) would be added to the National Wild and Scenic Rivers System under Alternative PRF as follows:

- 48.5 miles - Wild river
- 17.3 miles - Scenic River
- 13.9 miles - Recreation River

Water-oriented recreation and scenic quality would be enhanced by designation. Resource management activities requiring river crossing, road access, and transmission rights-of-way would be curtailed within designated "wild" and "scenic" river segments. Water impoundments would be curtailed for all designated segments.

The Wild and Scenic River Act authorizes acquisition of land or easements once a river is designated. However, land acquisition is authorized only on a willing seller basis. Easements can be acquired by the Federal government in lieu of fee acquisition. Assuming that private lands remain in private ownership, the State and County, along with the landowners, would be encouraged to cooperate in the planning and administration of the wild and scenic rivers.

Both the North Fork Trinity River and Virgin Creek recommendations, if approved by Congress, would extend wild

and scenic river classification into the Trinity Alps Wilderness. Such classification would provide specific prohibition against the damming of these rivers within the Wilderness.

Vegetative manipulation, for the purposes of improving timber yields or wildlife habitat, would be most constrained in river areas designated "wild" or "scenic". River areas with a "recreation" designation allow more opportunities for wildlife and timber management, provided the river values for which the rivers were designated are protected or enhanced.

In general, land uses within the river areas which exist when the rivers are designated may be permitted to continue. However, new land uses must be evaluated for their compatibility with the laws, regulations and policies associated with legally designated wild and scenic rivers.

Restrictions on land use are greatest for "wild" river areas. Such rivers represent primitive vestiges of America accessible primarily by trail. Fewer restrictions on management would be placed on "scenic" river areas. These areas, however, would remain largely undeveloped. "Recreational" river areas would have the least restrictions on management activities, and development, consistent with guidelines, could take place.

Alternative PRF does not recommend designation for the upper and lower McCloud River, the Sacramento River, and Squaw Valley Creek. The effects of this non-designation are as follows:

- 1 Fisheries and water quality would be protected by doing no scheduled timber harvest within an average riparian management zone (RMZ) width of 350 feet on each side of creeks and rivers.
- 2 Dams or diversions could be proposed.
- 3 Legal mineral exploration and extraction would be allowed outside of wilderness boundaries. Within wildernesses exploration and extraction would be subject to valid existing rights.
- 4 In the remaining 1/4 mile river corridors outside of RMZs, timber harvest would be as permitted in the prescription being applied (see Alternative PRF map). This ranges from no scheduled timber harvest where the Semi-primitive Non-motorized (SPNM) prescription is applied to modified timber harvest where the Roaded Natural (RN) prescription is applied.

- 5 Late successional habitat would be retained within wildernesses and SPNM areas. However, this habitat would decline significantly within RN areas outside of RMZs.
- 6 A Coordinated Resource Management Plan has been developed between the Forest Service and private landowners along the lower McCloud to govern uses within the river corridor (See Appendix N in the Forest Plan)

Private landowners along the lower McCloud River would generally be satisfied with the recommendation for non-designation, since they have voiced opposition to designation. Private landowners along the upper McCloud River have also objected to designation and would be dissatisfied with a recommendation for designation. However, there are many individuals and river interest groups who favor designation.

Alternatives RPA (1990 RPA Program Emphasis) and CUR (No Action/No Change)

Alternatives RPA and CUR do not recommend designation for any additional wild and scenic rivers. The effects of this non-designation are as follows:

- 1 Fisheries and water quality would be protected for Alternatives RPA and CUR by doing minimal timber harvest within an average RMZ width of 350 feet on each side of creek and river.
- 2 Dams or diversions could be proposed.
- 3 Legal mineral exploration and extraction would be allowed outside of wilderness boundaries. Within wildernesses exploration and extraction would be subject to valid existing rights.
- 4 In the remaining 1/4 mile river corridors outside of RMZs, timber harvest would be as permitted in the prescription being applied (see Alternative RPA and CUR maps). This ranges from no scheduled timber harvest where the SPNM prescription is applied to intensive timber harvest where the Timber Management (TM) prescription is applied.
- 5 Older over-mature habitat would be retained within wildernesses and SPNM areas. However, this habitat would decline slightly within Semi-

primitive Motonzed (SPM) areas and significantly within RN and TM outside of RMZs.

Private landowners along the upper and lower McCloud River would generally be satisfied with not recommending the river for wild and scenic river designation. Many individuals and river interest groups favoring a designation recommendation would be dissatisfied.

Alternative CBF (Citizens for Better Forestry)

Alternative CBF recommends designation of nine study rivers and a portion of another one. If approved by an Act of Congress, such designation would assure the free-flowing conditions of these rivers (see **Table IV-19**). They include:

Beegum Creek - extends from the Forest boundary above SH 36 to Beegum Gorge. It includes 2.5 miles of river on National Forest land. It becomes the Bureau of Land Management (BLM) designation south of the Forest boundary.

Canyon Creek -- includes 21.5 miles of river. About 4.0 miles are in private ownership and 17.5 miles are National Forest land.

Hayfork Creek -- includes 14.0 miles of river. About 2.5 miles are in private ownership and 11.5 miles are National Forest land.

McCloud River -- includes 24.3 miles of the upper segment and 23.3 miles of the lower segment.

North Fork Trinity River -- includes 11.7 miles of river, all within National Forest land.

South Fork Trinity River -- includes 26.3 miles of river, 1.5 miles are in private ownership and 24.8 miles are within National Forest land.

Sacramento River -- includes,

Segment I 37.3 miles from Box Canyon Dam to the boundary of the Whiskeytown-Shasta-Trinity National Recreation Area,

Appendix E - Wild & Scenic Rivers Evaluation

Segment 2 - Upper Forks

North Fork 6.0 miles above Box Canyon Dam from the headwaters at the Sission-Callahan Trail crossing to the confluence of South Fork,

Middle Fork 5.4 miles from the headwaters of Toad Lake to the confluence of South Fork,

South Fork 10.4 miles from the headwaters in the Gumboot Lake area to Lake Siskiyou

Squaw Valley Creek -- includes 10.5 miles, all within National Forest land

Virgin Creek -- includes 11.7 miles, all within National Forest land

Approximately 116.6 miles (National Forest lands only) would be added to the National Wild and Scenic Rivers System, as follows

- 56.8 miles - Wild River
- 25.1 miles - Scenic River
- 34.7 miles - Recreation River

Water-oriented recreation and scenic quality would be enhanced by designation. Resource management activities requiring river crossing, road access, and transmission rights-of-way would be curtailed for designated wild and scenic segments. Water impoundments would be curtailed for all designated segments.

The Wild and Scenic Rivers Act authorizes acquisition of land or easements once a river is designated. However, any future land acquisition is envisioned to be only on a

willing seller basis. Easements can be acquired by the Federal government in lieu of fee acquisition. Assuming that private lands remain in private ownership, the State and County, along with the landowners, would be encouraged to cooperate in the planning and administration of the wild and scenic rivers.

In general, land uses within the river areas which exist when the rivers are designated may be permitted to continue. However, new land uses must be evaluated for their compatibility with the laws and regulations associated with wild and scenic rivers.

Restrictions on land use are greatest for "wild" river areas. Such rivers represent primitive vestiges of America accessible primarily by trail. Fewer restrictions on management would be placed on "scenic" river areas. These areas, however, would remain largely undeveloped. "Recreational" river areas would have the least restrictions on management activities, and development, consistent with guidelines, could take place.

Vegetative manipulation, for the purposes of improving timber yields or wildlife habitat, would be most constrained, assuming all else is equal, in river areas classified "wild" or "scenic" river areas with a "recreation" classification allow more opportunities for wildlife and timber management, provided the river values for which the rivers were classified are protected or enhanced.

Private landowners along the upper and lower McCloud River would object to designation. Designation is favored by many individuals and river interest groups.

Table E-4 summarizes the significant impacts by alternative for each river.

Table E-1
Identification and Description of River Segments

River - Segment	Description	length (miles)*	Status
Beegum Creek Main Fork	From Round Bottom to the Forest boundary in Section 5.	8.5 total (2.5 NF Wild, 6.0 NF Recreation)	Managed under multiple use. Portion of river from Forest boundary to State Highway 36 on BLM was determined to be eligible for Wild by BLM. All NF land.
South Fork	From the headwaters of South Fork, Section 36 adjacent to Forest Road 28N36 to the confluence of Middle Fork, Section 6.	7.0 total. (7.0 NF Wild)	Managed under multiple use. All NF land.
Canyon Creek 1	Trailhead at Ripstein to the confluence of the mainstem of the Trinity River.	15.0 total (11.0 NF Recreation)	Managed under multiple use. Majority of area is NF land.
2	Trailhead at Ripstein to the headwater in the Trinity Alps Wilderness.	6.5 total (6.5 NF Wild)	Entire segment is within the Trinity Alps Wilderness.
Hayfork Creek 1	Nine Mile Bridge to the confluence of the South Fork of the Trinity River.	14.0 total. (11.5 NF Scenic)	Managed under multiple use. Majority of the area is NF land.
McCloud River (upper) 1-3	Bartle to McCloud Reservoir	24.3 total (14.7 NF Recreation)	Managed under multiple use. Majority of the area is NF land.
McCloud River (lower) 4-10	McCloud Reservoir to Shasta Lake	23.3 total (4.3 NF Wild; 1.8 NF Scenic)	Small amount of area is NF managed under multiple use. Scenic quality maintained. Majority of area is private land.
North Fork Trinity River 1	From headwaters in the Trinity Alps Wilderness to existing designated river	11.7 total (11.7 NF Wild)	Designated Trinity Alps Wilderness.

* - Total miles includes National Forest and private lands. However, the number of miles of private land is not broken down.
 BLM - Bureau of Land Management
 NF - National Forest

**Table E-1 (continued)
Identification and Description of River Segments**

River - Segment	Description	Length (miles)*	status
South Fork Trinity River 1-5	From headwaters of the South Fork Trinity River in the Yolla Bolly-Middle Eel Wilderness to Highway 36, Forest Glen	26.3 total (16.1 NF Wild, 5.8 NF Scenic; 2.9 NF Recreation)	Managed under multiple use outside of Yolla Bolly-Middle Eel Wilderness. Managed as Wilderness inside Yolla Bolly-Middle Eel Wilderness.
Sacramento River 1	Box Canyon Dam to the boundary of Whiskeytown-Shasta-Trinity National Recreation Area	37.3 total (6.1 NF Recreation)	Small amount of area is NF land managed under multiple use. Scenic quality is protected. Majority of area is private land.
Sacramento River 2 North Fork	Above Box Canyon Dam. From headwaters at the Sisson-Callahan Trail crossing to the confluence of South Fork.	6.0 total (6.0 NF Recreation)	Managed under multiple use. The upper 1/2 is located in the Mt. Eddy Further Planning Area. All NF land.
Middle Fork	From headwaters of Toad Lake to the confluence of South Fork.	5.4 total (5.4 NF Recreation)	Managed under multiple use. All NF land.
South Fork	From headwaters in the Gumboot Lake area to Lake Siskiyou.	10.4 total (10.2 NF Recreation)	Managed under multiple use. Majority of area is NF land.
Squaw Valley Creek 1-2	Confluence of Cabin Creek to the confluence of the upper McCloud River.	10.5 total (4.0 NF Wild, 6.0 NF Scenic)	Managed under multiple use. Small amount of private land near confluence with upper McCloud River.
Virgin Creek 1	From headwaters within the Salmon Mountains of the Trinity Alps Wilderness to the confluence of New River.	11.7 total (11.7 NF Wild)	Designated Trinity Alps Wilderness.
TOTAL MILES		217.9 (Federal and Private land) 151.2 (NF land)	

**Table E-2
Outstandingly Remarkable Values Summary**

Beegum Creek	
Values	Segments I-2; I
Cultural/Historical	Pre-historic Indians and some mining
Fisheries	Moderate populations of native rainbow trout. A waterfall outside the Forest boundary prevents fish migrations into upper portions of the river
Geology	* Rugged in gorge below the Forest boundary. Serpentinized soils above the Forest boundary with a stable stream channel.
Visual Quality/Scenery	Variety Class B, Sensitivity Levels 3 and 4
Wildlife	Common
Canyon Creek	
Values	Segments I-2
Cultural/Historical	Prehistoric Indians and history of gold mining
Fisheries	Moderate populations of steelhead, salmon and native trout.
Geology	Rugged. 70 percent (+) side slopes, unstable soils and past flooding have created landslides
Visual Quality/Scenery	*Variety Class A, Sensitivity Level 1, rugged topography, access road parallels segment I, some evidence of early mining in segment I
Wildlife	Common
Hayfork Creek	
Values	Segment I
Cultural/Historical	Prehistoric Indians and history of mining
Fisheries	* Moderate to high populations of steelhead, salmon, and native rainbow trout
Geology	Rugged. 70 percent (+) side slopes, unstable soils have created landslides
Visual Quality/Scenery	*Variety Class A, Sensitivity Level 2, rugged topography, two road crossings, one residence evident, a few secondary roads terminate near streamside
Wildlife	Common

*Outstanding Remarkable Values

The Bureau of Land Management (BLM) has identified this section of Beegum Creek as eligible for Wild River designation

**Table E d (continued)
Outstandingly Remarkable Values Summary**

McCloud River

Values	Segments 1-3	Segments 4-10
Cultural/Historical	Significant Indian encampment, cave	* Large Indian encampments, historical settlements, remnants of late 1800 and early 1900 resorts
Fishenes	* Home of redband trout	* Nationally significant <i>trout</i> fishenes, Dolly Varden <i>trout</i>
Geology	* Deep flat soils, waterfalls, Big Springs due to volcanic formations	* Rock outcrops, waterfalls, pools
Visual Quality/Scenery	* Variety Class A, headwaters, perennial stream, falls, camping, private homes, logging visible	Rugged topography, low stream flow, falls
Wildlife	Common	Common

North Fork Trinity River

Values	Segment I
Cultural/Historical	Remnants of old gold mining
Fishenes	* Excellent native trout and anadromous fisheries
Geology	Unstable sideslopes, gold deposits present
visual Quality/Scenery	*Variety Class A, spectacular views, rugged, waterfalls, pools
Wildlife	Common

South Fork Trinity River

Values	Segments 1-5
Cultural/Historical	Remnants of old homesteads
Fishenes	* Excellent anadromous fishery Has been designated as a Model Steelhead Stream Demonstration Area because of habitat
Geology	Very unstable sideslopes
visual Quality/Scenery	* Variety Class A, scenic stream, pools, rapids
Wildlife	Common area for spotted owls and bald eagles

*Outstandingly Remarkable Values

**Table E-2 (continued)
Outstandingly Remarkable Values Summary**

Sacramento River	
Values	Segment 1
Cultural/Historical	Significant Indian encampments
Fisheries	* Nationally significant trout and salmon fishery
Geology	Rugged, waterfalls, pools, Box Canyon, Carte Crag
Visual Quality/Scenery	* Variety Class A, rugged, waterfalls, pools, vegetation
Wildlife	Common
Values	Segment 2 - Upper Forks
Cultural/Historical	The area was used as a transportation corridor by pre-historic populations and probably served as a major connecting route between the upper Sacramento and upper Trinity watersheds
Fisheries	Important water quality stream containing inland rainbow trout. South Fork is stocked regularly during the summer months
Geology	All segments are free-flowing to Lake Siskiyou with numerous pools and riffles. The stream courses are incised in bedrock, moderately rugged and scenic. Side-slopes and channels are moderately stable. The entire watershed is underlain by ultramafic rock.
Visual Quality/Scenery	Variety Class B, Sensitivity Levels 1-3
Wildlife	Common area for spotted owls and bald eagles
Squaw Valley Creek	
Values	Segments 1-2
Cultural/Historical	Prehistoric Indians
Fisheries	* Native trout fisheries
Geology	Rugged, waterfalls, pools, deep, flat soils
Visual Quality/Scenery	* Variety Class A, rugged, waterfalls, pools
Wildlife	Common
*Outstandingly Remarkable Values	

Table E-2 (continued)
Outstandingly Remarkable Values Summary

Virgin-Creek

Values	Segment I
Cultural/Historical	Remnants of old mining
Fishenes	*Native trout and anadromous fishenes
Geology	Rugged, waterfalls, unstable sideslopes, shallow soils
Visual Quality/Scenery	Variety Class A, rugged, waterfalls, pools
Wildlife	Common

*Outstandingly Remarkable Values.

Table E-3
Wild and Scenic Rivers Study - Eligibility/Classification Analysis

Qualifying Answers	Block 1 - Wild				Block 2 - Scene			Block 3 - Recreation		Block 4 - All		
	free of Impoundments	Generally Inaccessible except by Trail	Nat watershed Shoreline Essentially Primitive	Waters Impolluted	Free of Impoundments	Accessible in Places by Roads	Water shed/ Shoreline Largely Un-developed	Readily Accessible by Road	Past Impoundments or Diversions are Unobtrusive	May have Development on Shoreline	Possesses Outstandingly Remarkable Resource Values	Classification/ Eligibility
Beegum Creek												
Main Fork	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Scenic
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Wild
Segment 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	Wild
South Fork												
Segment 1	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	No	Wild
Canyon Creek												
Segment 1	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Wild
Hayfork Creek												
Segment 1	Yes	Yes	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Scenic
McCloud River												
Segment 1	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 2	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 3	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 4	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 6	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 7	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 8	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 9	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 10	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
North Fork Trinity River												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild

EXPLANATION: To qualify for Wild, there must be 4 yesses in Block 1, for Scene, there must be 3 yesses in Block 2 and one yes in Block 4, for Recreation, there must be one yes in Block 3 and one yes in Block 4

Table E-3 (continued)
Wild and Scenic Rivers Study - Eligibility/Classification Analysis

Qualifying Answers	Block 1 - Wild				Block 2 - Scenic			Block 3 - Recreation			Block 4 - All	
	Free of Impoundments	Generally Inaccessible except by Trail	Watershed Shoreline Essentially Pristine	Waters Unpolluted	Free of Impoundments	Accessible in Places by Roads	Watershed/Shoreline Largely Undeveloped	Readily Accessible by Road	Past Impoundments or Diversions are Unobtrusive	May have Development on Shoreline	Possesses Outstandingly Remarkable Resource Values	Classification/Eligibility
South Fork Trinity River												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 2	Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 4	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Segment 5	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Sacramento River												
Segment 1	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Recreation
Segment 2												
North Fork	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Recreation
Middle Fork	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Recreation
South Fork	Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Recreation
Squaw Valley Creek												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild
Segment 2	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Scenic
Virgin Creek												
Segment 1	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	Yes	Wild

Table E-4
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers*

Beegum Creek				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes, Segment 2 only	No	No	Yes, Segment 2 only
Fisheries and Water Quality	Wild Segments, no effects	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	SPNM, no timber harvest, RN, modified timber harvest outside of RMZs	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS Class of SPNM, RN, R, VQO of R, PR, M, MM	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	SPNM, older over-mature habitat would remain, RN, older over-mature habitat would decline slightly, R, older over-mature habitat would decline	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

* See the last page of this table for abbreviated terms and meanings

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Canyon Creek				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	Wild segment, no effect, Recreation segment has an average RMZ width of 350 feet on each side of the creek with no timber harvest. Dams or diversions not permitted.	Wilderness, no effect, RN has an average RMZ width of 350 feet on each side of the creek with minimal timber harvest. Dams and diversions could be proposed.	Same as Alternative RPA	Wild segment, no effect, Recreation segment has an average RMZ width of 350 feet on each side of the creek with no timber harvest. Dams or diversions not permitted.
Minerals	Wild segment, subject to valid existing rights, otherwise corridors are withdrawn from mineral entry. Recreation segment, open to exploration and extraction consistent with the law.	Same as Alternative PRF	Same as Alternative PRF	Wild segment, subject to valid existing rights, otherwise corridors are withdrawn from mineral entry. Recreation segment, open to exploration and extraction consistent with the law.
Timber	Wilderness, no timber harvest, RN modified timber harvest would occur outside of RMZs.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	Wilderness, ROS class of P, VQO of P, RN ROS class of RN, VQO of PR.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Wilderness, older over-mature habitat would be retained, RN, older over-mature habitat outside of RMZs would decline significantly.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Hayfork Creek				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the creek with no timber harvest. Dams and diversions not permitted.	Average RMZ width of 350 feet on each side of the creek with minimal timber harvest. Dams and diversions could be proposed.	Same as Alternative RPA	Average RMZ width of 350 feet on each side of the creek with no timber harvest. Dams or diversions not permitted.
Minerals	Open to exploration and extraction consistent with the law.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	SPNM, no timber harvest. RN, modified timber harvest would occur outside of RMZs.	SPNM, no timber harvest. Modified timber harvest would occur in remaining areas outside of RMZs.	RN, modified timber harvest would occur outside of RMZ.	Scenic designation would allow minimal timber harvest outside of RMZs.
Visual Quality and Recreation	SPNM, ROS class of SPNM, VQO of R. RN, ROS class of RN, VQO of PR.	SPNM, ROS class of SPNM, VQO of R. Timber management, ROS class of RN, VQO of M.	ROS class of RN, VQO of PR.	SPNM, ROS class of SPNM, VQO of R. RN, ROS class of RN, VQO of PR.
Wildlife	SPNM, older over-mature habitat would be retained. RN, older over-mature habitat would decline significantly outside of RMZs.	Same as Alternative PRF	Older over-mature habitat would decline significantly outside of RMZs.	Older over-mature habitat would decline slightly outside of RMZs.

**Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers**

Upper McCloud River				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	<i>No</i>	<i>No</i>	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the river with no timber harvest. Dams or diversions not permitted	Average RMZ width of 350 feet on each side of the river with minimal timber harvest. Dams or diversions could be proposed	Same as Alternative RPA	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	Modified timber harvest would occur outside of RMZs	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of RN. VQO of PR	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat outside of RMZs would decline significantly	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

lower McCloud River				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the river with no timber harvest. Dams or diversions could be proposed.	Average RMZ width of 350 feet on each side of the river with minimal timber harvest. Dams or diversions could be proposed.	Same as Alternative PRF	Average RMZ width of 350 feet on each side of the river with no timber harvest. Dams or diversions not permitted.
Minerals	Open to exploration and extraction consistent with the law.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF except Wild segments are subject to valid existing rights, otherwise, corridors would be withdrawn from mineral entry.
Timber	SPNM, no timber harvest. SPM, minimal timber harvest outside of RMZs.	SPNM, no timber harvest. Modified timber harvest in remaining areas outside of RMZs.	Modified timber harvest would occur within areas outside of RMZs.	Same as Alternative PRF
Visual Quality and Recreation	SPNM, ROS class of SPNM, VQO of R. SPM, ROS class of SPM, VQO of R.	SPNM, ROS class of SPNM, VQO of R. ROS class of RN, VQO of PR and M on remainder of area.	ROS class of RN, VQO of PR	Same as Alternative PRF
Wildlife	SPNM, older over-mature habitat would be retained. SPM, older over-mature habitat would decline slightly.	SPNM, older over-mature habitat would be retained. Older over-mature habitat would decline significantly in remainder of the area.	Older over-mature habitat would decline significantly outside of RMZs.	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

North Fork Trinity River				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	No effect Dams or diversions not permitted	No effect Dams or diversions could be built consistent with the Wilderness Act	Same as Alternative RPA	Same as Alternative PRF
Minerals	Subject to valid existing rights, otherwise corridor would be withdrawn from mineral entry	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	No timber harvest	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of P, VQO of P	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat would be retained	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

South Fork Trinity River				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	Wild segments, no effects Recreation and Scenic segments, average RMZ width of 350 feet each side of the river and inner gorges with no timber harvest Dams and diversions not permitted	No timber harvest in inner gorges. Average RMZ width of 350 feet on each side of the river with minimal timber harvest. Dams and diversions could be proposed	Same as Alternative RPA	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law except Wild segments are subject to valid existing rights, otherwise corrdon are withdrawn from mineral entry	Open to exploration and extraction consistent with the law.	Same as Alternative RPA	Same as Alternative PRF
Timber	Wild segments, no timber harvest. Scenic segments, minimal timber harvest Recreation segments, modified timber harvest	SPNM, no timber harvest. SPM, minimal timber harvest. RN, modified timber harvest	Same as Alternative RPA	Same as Alternative PRF
Visual Quality and Recreation	Wild segments, ROS class of SPNM, VQO of R. Scenic segments, ROS of SPM, VQO of PR. Recreation segments, ROS of RN, VQO of PR	SPNM, ROS class of SPNM, VQO of R. SPM, ROS class of SPM. VQO of PR. RN, ROS class of RN, VQO of PR	Same as Alternative RPA	Same as Alternative PRF
Wildlife	Wild segments, retain older over- mature habitat. Scenic segments, habitat would decline slightly Recreation segments, habitat would decline significantly	SPNM, retain older over-mature habitat. SPM, habitat would decline slightly. RN, habitat would decline significantly	Same as Alternative RPA	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Sacramento River - Segment I				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	Average RMZ width of 350 feet on each side of the river with no timber harvest. Dams and diversions not permitted.	Average RMZ width of 350 feet on each side of the river with minimal timber harvest. Dams and diversions could be Drownsed.	Same as Alternative RPA	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	Modified timber harvest would occur outside of RMZs.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of RN, VQO of PR	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat outside of RMZs would decline significantly.	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Sacramento River - Segment 2 - Upper Forks				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	No Effect. Dam exists at Lake Siskiyou below the three segments	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Minerals	Open to exploration and extraction consistent with the law	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	Minimum timber harvest outside of RMZs located within HCAs	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of SPNM, SPM, RN, VQO of R, PR, M	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat would be retained. Areas outside of HCAs would have a slight decline in habitat	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Squaw Valley Creek				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	No	No	No	Yes
Fisheries and Water Quality	Wild segments, no effect. Scenic segment has an average RMZ width of 350 feet on each side of the creek with no timber harvest. Dams or diversions not permitted.	Average RMZ width of 350 feet on each side of the creek with minimal timber harvest. Dams or diversions could be proposed.	Same as Alternative WA	Same as Alternative PRF
Minerals	Wild segments, subject to valid existing rights, otherwise corridors are withdrawn from mineral entry. Scenic segments, open to exploration and extraction consistent with the law.	Open to exploration and extraction consistent with the law.	Same as Alternative WA	Same as Alternative PRF
Timber	Wild segments, no timber harvest. Scenic segments, minimal timber harvest outside of RMZs.	Modified timber harvest in areas outside of RMZs.	Modified timber harvest in areas outside of RMZs.	Same as Alternative PRF
Visual Quality and Recreation	Wild segments, ROS class of P, VQO of P. Scenic segments, ROS class of SPM, VQO of R.	ROS class of RN, VQO of M.	ROS class of RN, VQO of PR.	Same as Alternative PRF.
Wildlife	Wild segments, retain older over-mature habitat. Scenic segments, older over-mature habitat would decline slightly outside of RMZs.	Older over-mature habitat would decline significantly outside of RMZs.	Same as Alternative RPA.	Same as Alternative PRF.

Table E-4 (continued)
Summary of Significant Impacts of Alternatives on Potential Wild and Scenic Rivers

Virgin Creek				
Resource	Alternative PRF	Alternative RPA	Alternative CUR	Alternative CBF
Recommended Designation	Yes	No	No	Yes
Fisheries and Water Quality	No effect Dams or diversions not permitted	No effect Dams or diversions could be built consistent with the Wilderness Preservation Act	Same as Alternative RPA.	Same as Alternative PRF
Minerals	Subject to valid existing rights, otherwise corridors are withdrawn from mineral entry	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Timber	No timber harvest	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Visual Quality and Recreation	ROS class of P; VQO of P	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF
Wildlife	Older over-mature habitat would be retained	Same as Alternative PRF	Same as Alternative PRF	Same as Alternative PRF

Abbreviated Terms and Meanings:

HCA = Habitat Conservation Areas

RMZ = Riparian Management Zone

ROS = Recreation Opportunity Spectrum

ROS Classes

P = Primitive

SPNM = Semi-primitive Non-motorized

SPM = Semi-primitive Motorized

RN = Roaded Natural

R = Rural

VQO = Visual Quality Objective

VQOs

P = Preservation

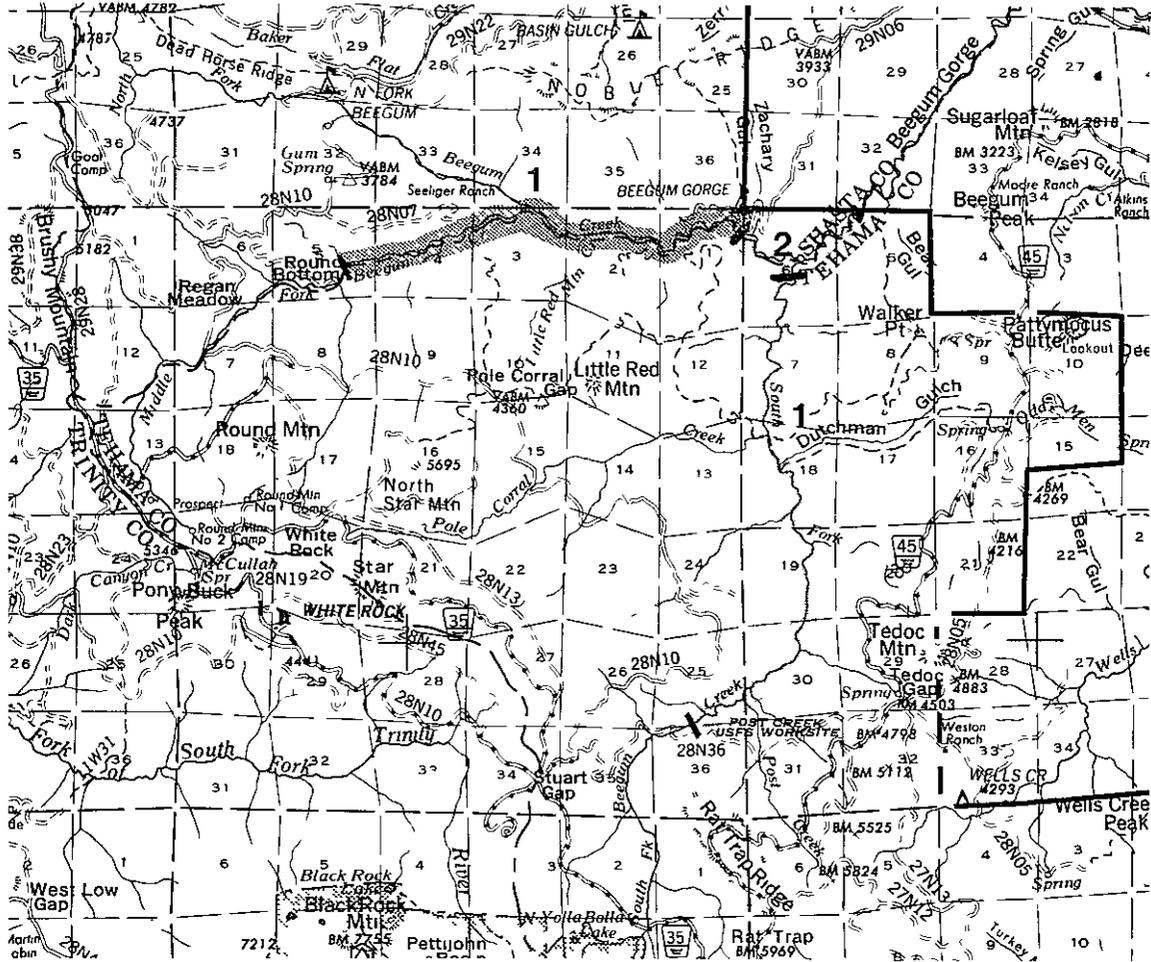
R = Retention

PR = Partial Retention

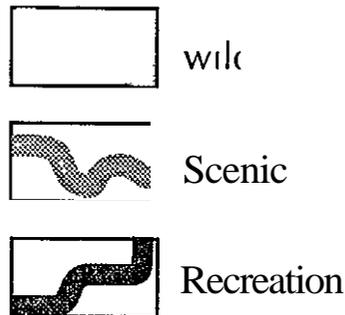
M = Modification

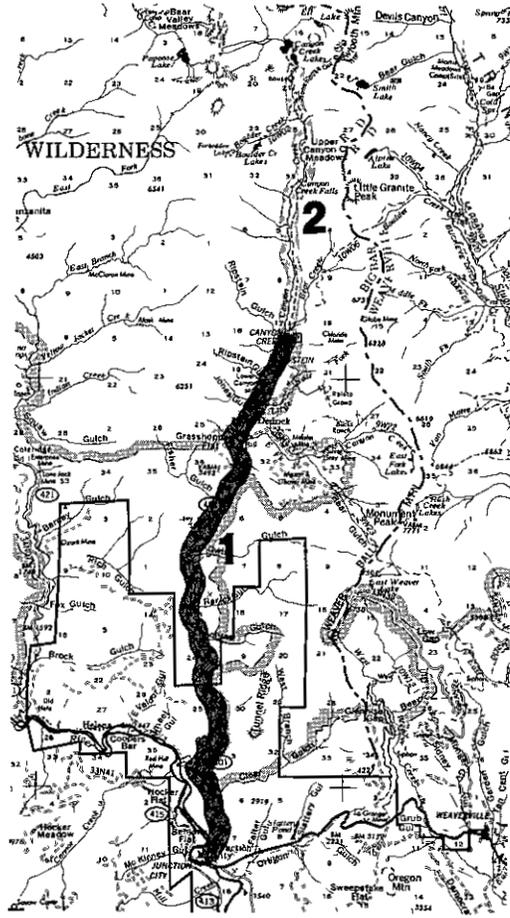
MM = Maximum Modification

UM = Unacceptable Modification



Wild & Scenic Rivers BEEGUM CREEK





Wild & Scenic Rivers **CANYON CREEK**



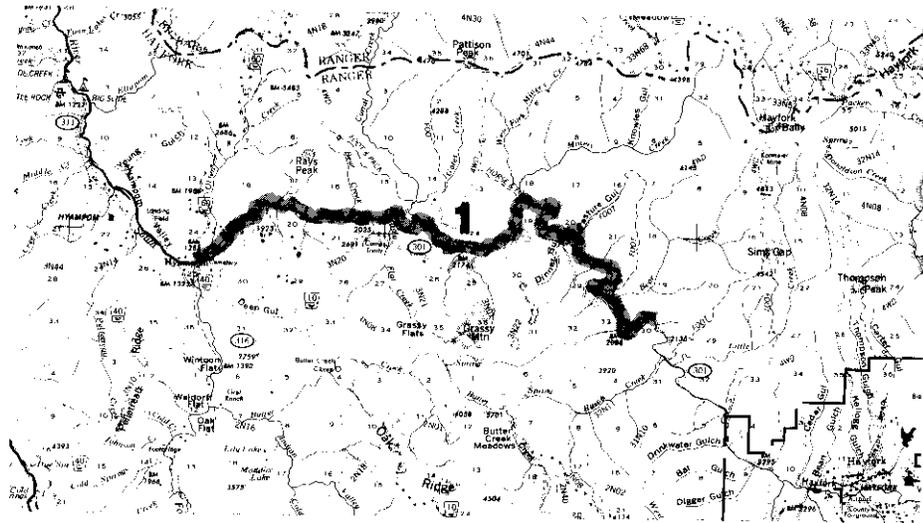
Wild



Scenic



Recreation



Wild & Scenic Rivers **HAYFORK CREEK**



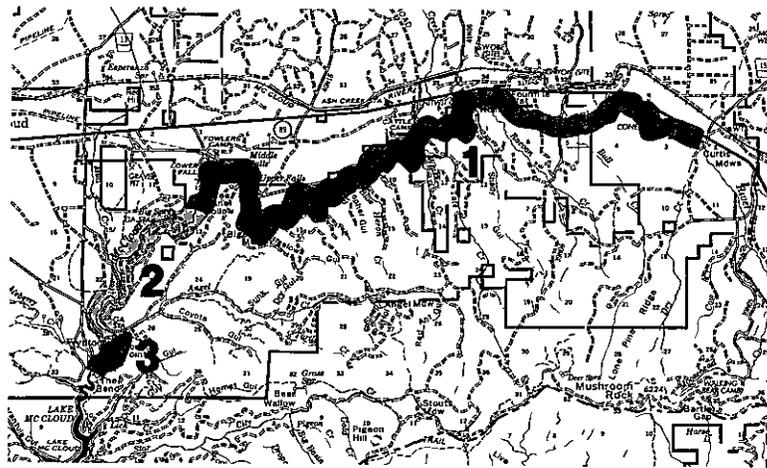
Wild



Scenic



Recreation



Wild & Scenic Rivers
UPPER McCLOUD RIVER



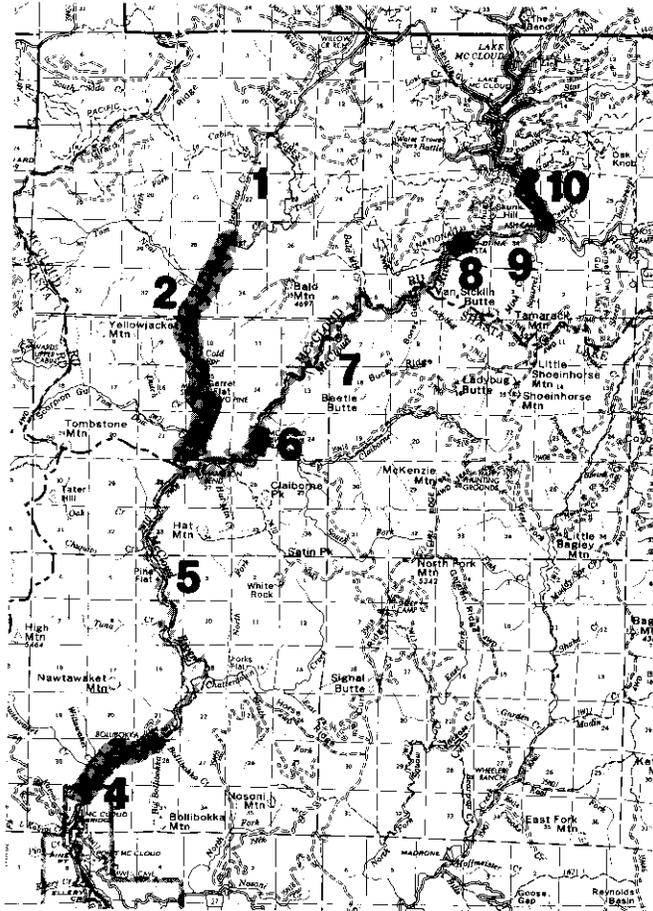
Wild



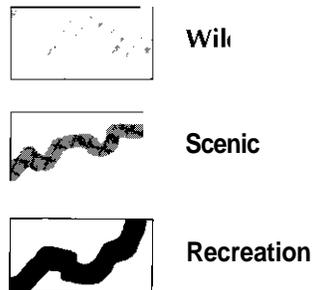
Scenic

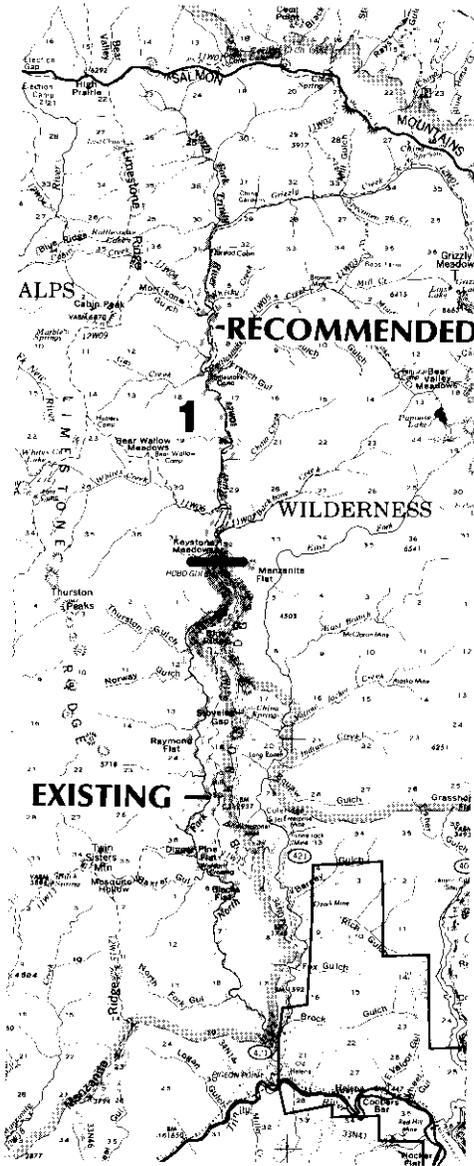


Recreation



Wild & Scenic Rivers
**LOWER McCLOUD RIVER
& SQUAW VALLEY CREEK**





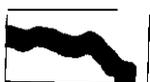
Wild & Scenic Rivers NORTH FORK TRINITY RIVER



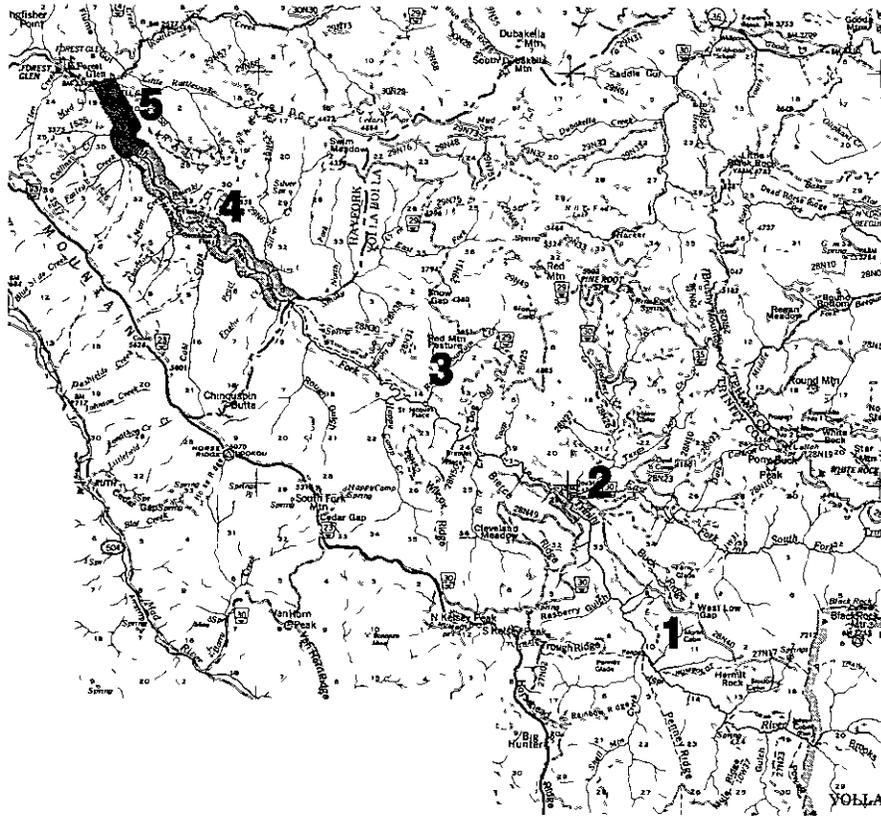
Wild



Scenic

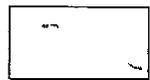


Recreation



Wild & Scenic Rivers

SOUTH HALF OF THE SOUTH FORK TRINITY RIVER



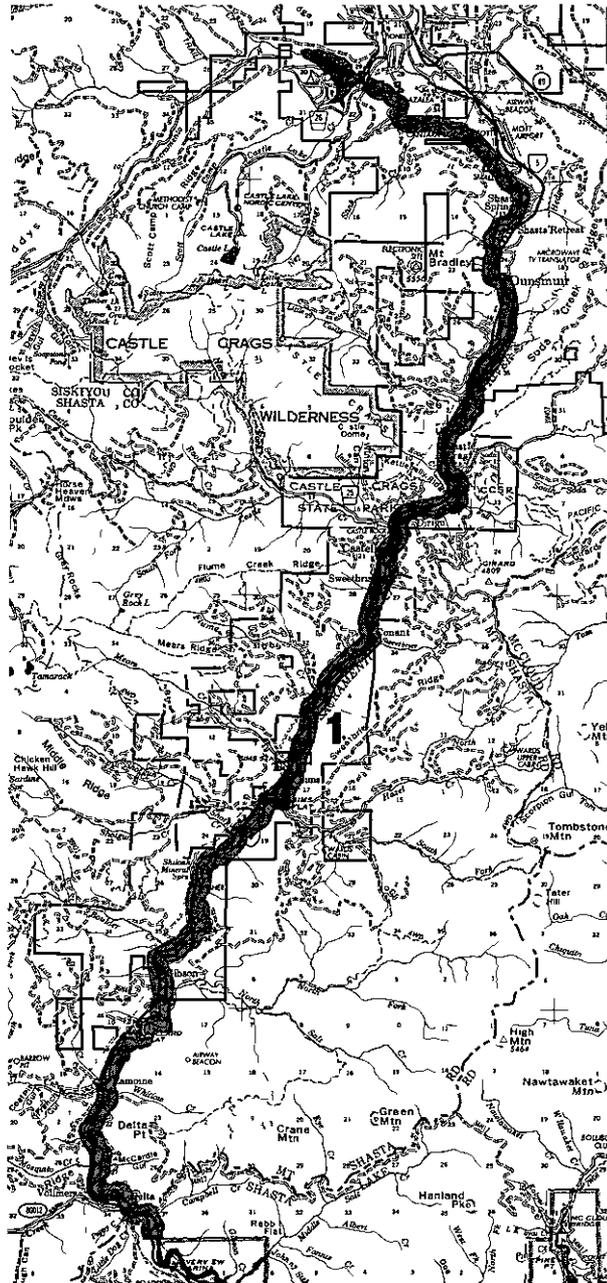
Wild



Scenic



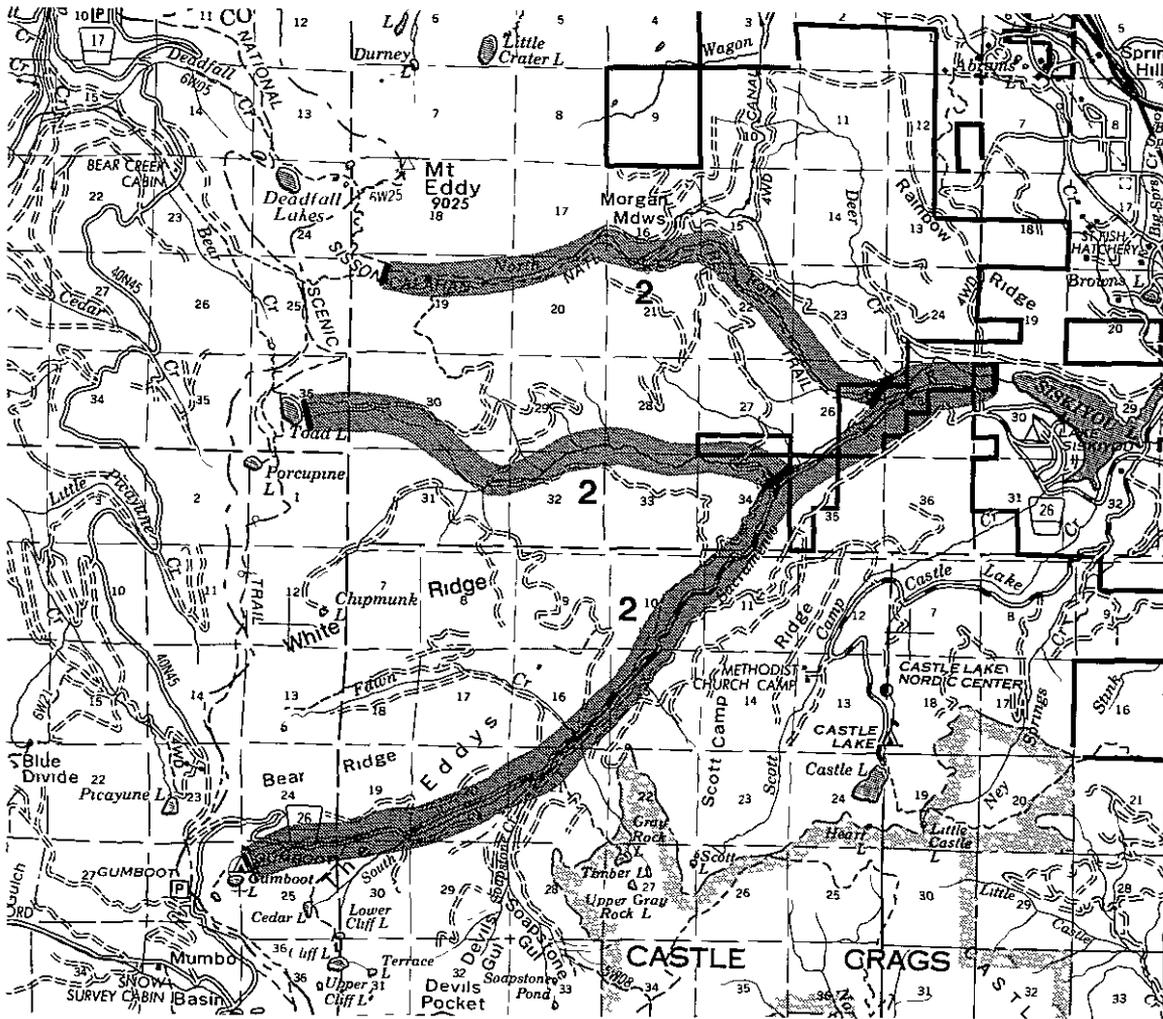
Recreation



Wild & Scenic Rivers

SACRAMENTO RIVER

-  Wild
-  Scenic
-  Recreation



Wild & Scenic Rivers

SACRAMENTO RIVER

UPPER FORKS



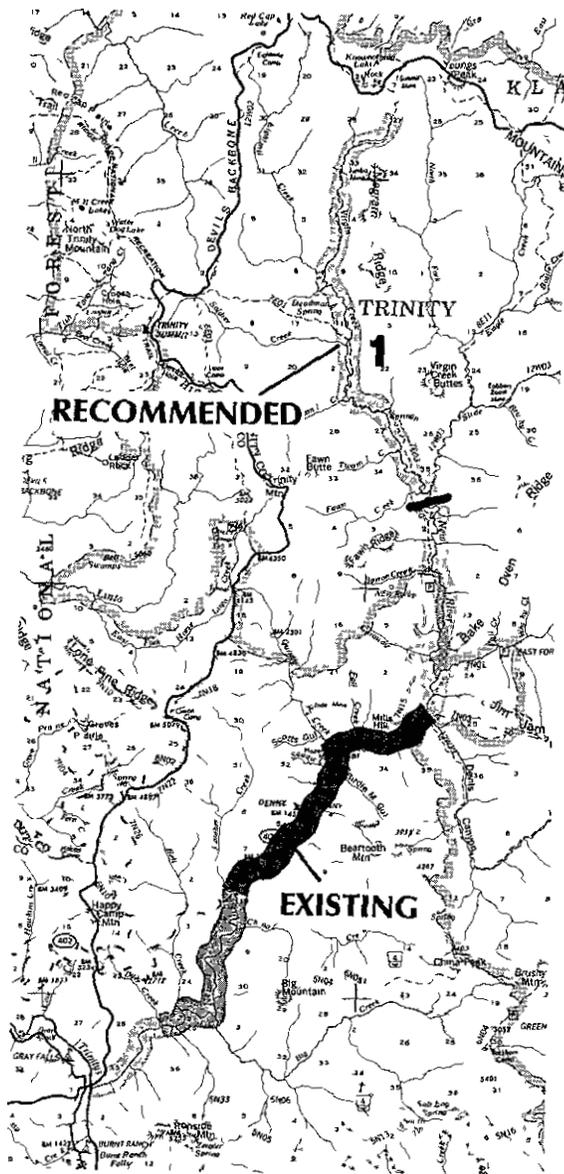
wild



Scenic



Recreation



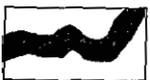
Wild & Scenic Rivers **NEW RIVER & VIRGIN CREEK**



Wild



Scenic



Recreation

Appendix

Research Natural Area Analysis

APPENDIX F

Research Natural Area Analysis

One Research Natural Area (RNA) has been established on the Shasta-Trinity National Forests. The Shasta Mud Flow RNA was designated by the Chief of the Forest Service in 1971. It represents the young-growth Pacific ponderosa pine target (Society of American Foresters [SAF] type number 244)* for the Cascade Range Physiographic Province and the scientific geologic value of a volcanic mud flow.

Fourteen proposed candidate areas are in various stages of the screening and establishment process (Refer to Chapter III - Special Areas Section). These candidates will be addressed in the Forest Plan and this Final Environmental Impact Statement (Final EIS) until the RNA committee completes its evaluation and the Regional Forester makes final recommendations.

Removal of candidate areas from the timber base will have an insignificant effect on timber outputs. Approximately 90 percent of the suitable timber acres would have been allocated to non-timber prescriptions in all the alternatives considered. Refer to Chapter IV for a detailed discussion of environmental consequences of RNA designation.

Scientific values of the candidate areas, with respect to Regional RNA network goals and present use and condition of these areas, are shown by **Tables F-1** and **F-2**, respectively.

The target system described in Forest Service Manual (FSM) Title 4063, Pacific Southwest Region, Supplement

No. 3, was used to determine vegetation elements in 11 physiographic provinces of California needed for representation in the RNA system. The Shasta-Trinity National Forests are located within parts of the Klamath Mountains, Cascade Range, and Modoc Plateau Physiographic Provinces. Personnel of the Shasta-Trinity National Forests are responsible for coordinating with the other Forests in these physiographic provinces and for nominating candidates representative of 34 desired elements.

Of the 34 elements, 8 constitute the main elements found in the 14 proposed candidate areas. Eight other elements are also represented among the candidate RNAs, and three do not occur on the Forests (i.e., the three Baker Cypress targets). Refer to **Table F-1** "Representation of RNA Targets in the Shasta-Trinity RNA Candidates." Unfilled targets will become future inventory needs for RNA representation on the Forests unless they are filled by RNAs established on other Forests.

Forest personnel also projected resource allocations which would take place if the RNA Committee rejected a candidate area and released it for other land management purposes. This "in-lieu-of" analysis is part of the official planning records which are available for on-premise review at the headquarters of the Shasta-Trinity National Forests in Redding, California.

*See glossary for an explanation of Forest cover types.

Appendix F - RNA Analysis

Vegetation Type	Physiographic Province	Bald		Deviils			phy Glade
		Mountain Creek	Bear Creek	Cascade	Basin	Hosselkus	
SAF 207 Red Fir*	Klamath Mtn						P
SAF 207 Red fir	Cascade Range			P			
SAF 211 White fir	Klamath Mtn					S	
SAF 211 White fir	Cascade Range						
SAF 222 Black cottonwood/willow	Klamath/Cascade						
SAF 229 Pacific Douglas-fir	Klamath Mtn					S	
SAF 230 Douglas-fir/w hemlock	Klamath Mtn						
SAF 231 Port-Orford-cedar	Klamath Mtn				P		
SAF 234 Douglas-fir/tanoak/Pacific madrone	Klamath Mtn						
SAF 237 Interior ponderosa pine	Modoc Plateau						
SAF 243 Sierra Nevada mixed conifer	Klamath Mtn				S	S	S
SAF 243 Sierra Nevada mixed conifer	Cascade Range						
SAF 244 Pacific ponderosa pine/Douglas-fir	Klamath Mtn					S	P
SAF 244 Pacific ponderosa pine/Douglas-fir	Cascade Range						
SAF 246 California black oak	Klamath Mtn					P/S	
SAF 246 California black oak	Cascade Range						
SAF 247 Jeffrey pine	Klamath Mtn						
SAF 247 Jeffrey pine	Modoc Plateau						
SAF 248 Knobcone pine	Klamath Mtn						
SAF 248 Knobcone pine	Cascade Range						
SAF 256 California mixed subalpine	Cascade Range						
K-24 Western juniper**	Modoc Plateau						
K-30 Foothill woodland	Cascade Range						
K-34 Montane chaparral	Klamath Mtn						
Darlingtonia bog	Klamath Mtn				S		
Moss bog	Klamath Mtn						
Alpine Fellfields	Klamath Mtn						
Brewer spruce	Klamath Mtn						
Enriched conifer	Klamath Mtn						
Foxtail pine	Klamath Mtn						
MacNab cypress***	Cascade Range						
Baker cypress***	Klamath Mtn / Cascade Range / Modoc Plateau						
Other Unique Elements	All	U	U		U	U	

S = Secondary RNA Targets
 U = Undetermined at this time
 ** Kuchler's Vegetative Types
 *** Targets are not applicable to Shasta-Trinity National Forest lands

Table F-1

Vegetation Type	Physiographic Province	Mt. Eddy	Preacher Meadows	Red Butte-Red Fir Ridge	Rough Gulch	Smoky Creek	South Fork Mtn.	Stuart Fork
SAF 207 Red Fir*	Klamath Mtn.							
SAF 207 Red fir	Cascade Range			P				
SAF 211 White fir	Klamath Mtn.							
SAF 211 White fir	Cascade Range							
SAF 222 Black cottonwood/willow	Klamath/Cascade							
SAF 229 Pacific Douglas-fir	Klamath Mtn.				P		P	
SAF 230 Douglas-fir/w hemlock	Klamath Mtn.							
SAF 231 Port-Orford-cedar	Klamath Mtn.							
SAF 234 Douglas-fir/tanoak/Pacific madrone	Klamath Mtn.							
SAF 237 Interior ponderosa pine	Modoc Plateau							
SAF 243 Sierra Nevada mixed conifer	Klamath Mtn		P					
SAF 243 Sierra Nevada mixed conifer	Cascade Range							
SAF 244 Pacific ponderosa pine/Douglas-fir	Klamath Mtn				S	P		
SAF 244 Pacific ponderosa pine/Douglas-fir	Cascade Range							
SAF 246 California black oak	Klamath Mtn							
SAF 246 California black oak	Cascade Range							
SAF 247 Jeffrey pine	Klamath Mtn.					S		
SAF 247 Jeffrey pine	Modoc Plateau							
SAF 248 Knobcone pine	Klamath Mtn.							
SAF 248 Knobcone pine	Cascade Range							
SAF 256 California mixed subalpine	Cascade Range			S				
K-24 Western juniper**	Modoc Plateau							
K-30 Foothill woodland	Cascade Range							
K-34 Montane chaparral	Klamath Mtn							P
Darlingtonia bog	Klamath Mtn.		S					
Moss bog	Klamath Mtn							
Alpine Fellfields	Klamath Mtn.							
Brewer spruce	Klamath Mtn							
Enriched conifer	Klamath Mtn							
Foxtail pine	Klamath Mtn	P						
MacNab cypress***	Cascade Range							
Other Unique Elements	All		U		U			
lands.								

Table F-2
Research Natural Area Candidates - Present Use Situation

RNA Candidate	Bald Mtn. Creek	Bear Creek	Cascade	Cedar Basin	Devils Rock- Hosselkus	Manzanita Creek	Murphy Glade
Timber Strata (Acres)							
00 Not Suitable		2,700	208	500	2,740	7,250	40
05 HX					1,150		
09 M2G		130					
11 M3G		1,170	240		510		850
12 M3P		500	40	660	580		92
18 R3G			862	-	-		210
19 R3P	-	-	650				68
Estimated Potential Biological Yield (Thousand Board Feet [mbf] / Year)							
05 HX					5		
09 M2G	-	52	-	-	-	-	-
11 M3G		498	95		95		350
12 M3P		240	15	260	20		36
18 R3G			340				66
19 R3P			260				28
Recreation (Recreation Visitor Days [RVDs])							
Dispersed Camping			270	300			10
Off-Highway Vehicle (OHV)							
Hunting		6	100	400	70		15
Fishing		60		60			
Snowmobile				45			
Threatened, Endangered and Sensitive (T, E & S) Animals (acres)							
00 Low Suitability	-	4,500	2,000	0	5,470	7,210	1,140
03 High Suitability		0	0	60	80	40	120
T, E & S Plants (Acres)							
00 No Known Occurrences	800	4,500	2,000	1,160	5,550	7,250	1,260
03 Known Occurrences	0	0	0	0	0	0	0
Potential T, E & S Animals (Acres)							
00 Low Suitability		2,940	2,000	1,160	0	7,250	1,140
03 High Suitability		1,560	0	0	4,980	0	120
Potential T, E & S Plants (Acres)							
00 Low Suitability	600	4,450	1,960	1,100	0	6,250	1,220
03 High Suitability	200	<50	<40	<60	5,550	< 1,000	<40
Wildlife Harvest Species (Acres)							
00 Not Suitable		720	60	100	1,340	2,240	
01 Low		600	1,460	250	0	470	1,190
02 Moderate		1,680	480	700	190	590	70
03 High		1,500	0	110	3,450	3,950	
Minerals (Acres)							
00 Not Suitable		0	2,000	1,160	0	56	1,260
03 Suitable		4,500	0	0	4,980	7,194	0

Table F-2
(Continued)

RNA Candidate	Mt. Eddy	Preacher Meadows	Red Butte- Red Fir Ridge	Rough Gulch	Smoky Creek	South Fork Mtn.	Stuart Fork
Timber Strata (Acres)							
00 Not Suitable	890	1,850	1,640	1,110	-	119	1,500
05 HX	-	-	-	-	-	-	-
09 M2G	-	-	-	300	-	119	-
11 M3G	-	-	-	2,130	523	823	-
12 M3P	-	-	-	420	477	119	-
18 R3G	-	-	-	-	-	-	-
19 R3P	-	-	-	-	-	-	-
Estimated Potential Biological Yield (Thousand Board Feet [mbf] /Year)							
05 HX	-	-	-	-	-	-	-
09 M2G	-	-	-	-	-	-	-
11 M3G	-	-	-	854	190	138	-
12 M3P	-	-	-	165	166	11	-
18 R3G	-	-	-	-	-	-	-
19 R3P	-	-	-	-	-	-	-
Recreation (Recreation Visitor Days [RVDs])							
Dispersed Camping	-	655	-	-	-	-	-
0%-Highway Vehicle (OHV)	-	438	-	-	-	-	-
Hunting	-	-	62	-	-	10	-
Fishing	-	6	-	-	-	-	-
Snowmobile	-	-	-	-	-	-	-
Threatened, Endangered and Sensitive (T,E&S) Animals (acres)							
00 Low Suitability	890	1,850	1,640	3,960	1,000	1,180	1,500
03 High Suitability	0	0	0	0	0	0	0
T,E & S Plants (Acres)							
00 No Known Occurrences	730	1,850	1,600	3,920	950	1,180	1,500
03 Known Occurrences	160	0	40	40	0	0	0
Potential T,E&S Animals (Acres)							
00 Low Suitability	890	1,850	1,235	3,860	1,000	1,124	1,500
03 High Suitability	0	0	405	100	0	56	0
Potential T,E&S Plants (Acres)							
00 Low Suitability	0	1,800	1,480	2,920	850	1,100	1,400
03 High Suitability	890	50	120	<1,000	100	80	100
Wildlife Harvest Species (Acres)							
00 Not Suitable	350	1,350	84	0	0	0	480
01 Low	540	220	1,276	210	0	174	540
02 Moderate	0	280	280	3,080	110	710	480
03 High	0	0	0	670	890	296	-
Minerals (Acres)							
00 Not Suitable	310	335	1,640	820	0	0	0
03 Suitable	580	1,515	0	3,140	1,000	1,180	1,500

Bald Mountain Creek

Description: The 800 acre Bald Mountain Creek area only recently has been proposed (Spring of 1993) by the Citizens for Better Forestry. This RNA would serve as a completely undisturbed benchmark watershed representative of other adjacent watersheds under timber management and would be monitored as a control watershed.

Map boundaries have not been defined as of this printing.

**Figure F-1
(not available
because boundaries have not been defined)**

Bear Creek

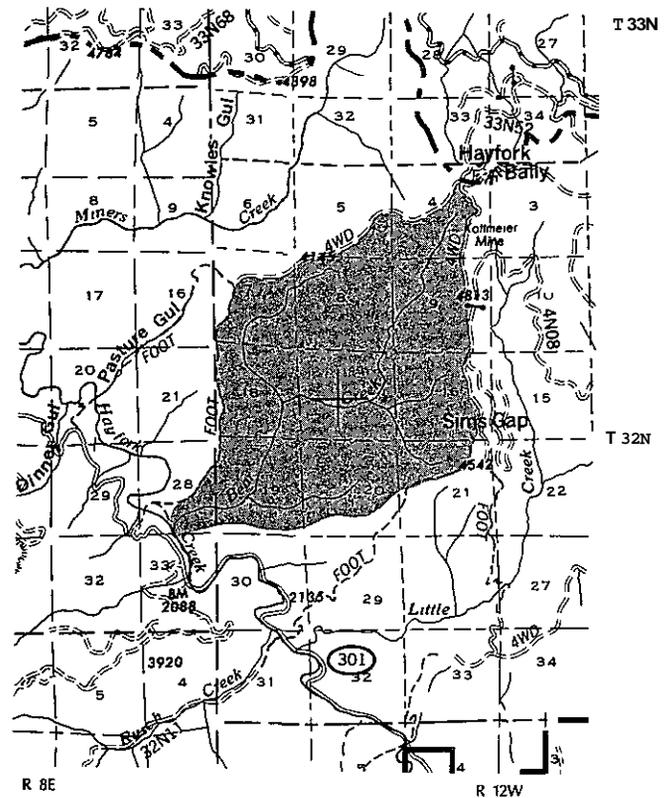
Description: The proposed Bear Creek Research Natura Area (RNA) is located on the Hayfork Ranger Distric approximately 6 air miles northwest of Hayfork. The area totals about 4,500 acres, including nearly 640 acres o private land. Bear Creek is a tributary to Hayfork Creek which in turn is a tributary to the South Fork Tnnity River. Elevations range from 650 to 1,900 feet. The Fores cover type is mixed conifer. Soils in much of the area arc developed from granitic geologic matenal which is ofter highly erodible.

Planning Status: This area was proposed by the Citizen: For Better Forestry in 1987. There has been no field reconnaissance or ecological survey.

Research Values: The Bear Creek area was proposed as a RNA to serve as a monrtoring benchmark watershed to determine the effects of land management activities or highly erodible granitic soils. The Bear Creek watershed would be monitored as a control watershed.

Resource Conflicts: Approximately 42 percent of the area contains potentially suitable timber land which could be managed for intensive timber management. The average annual sustained yield would be about 790 thousand board feet (mbf). The section of private land within the area, if managed for timber harvest or other land disturbing objectives, would conflict with the intended purpose of the RNA (watershed monitoring). There are no locatable mineral values within the proposed area. Prospecting for and possible removal of locatable minerals would be in conflict with the purpose of a RNA. The area is not usec for livestock grazing.

Figure F-2
Bear Creek



BEAR CREEK

Cascade

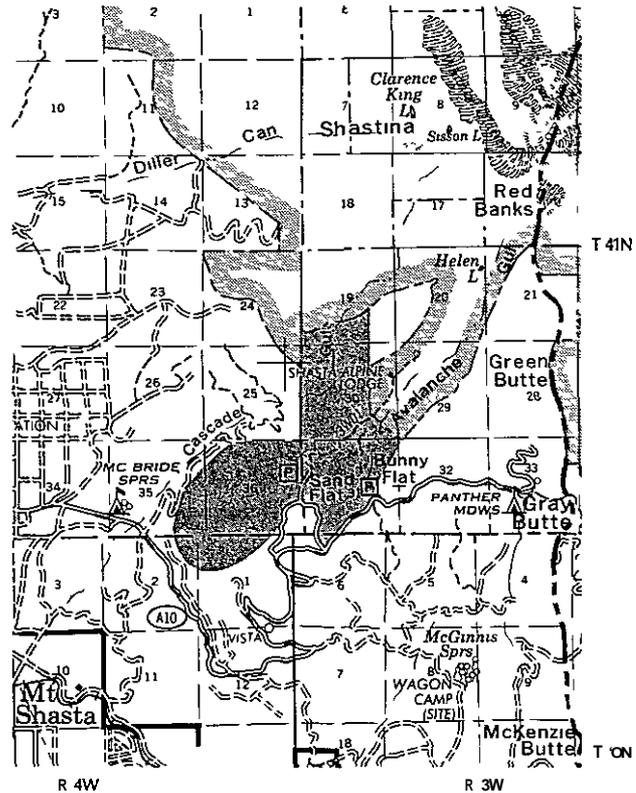
Description: The proposed Cascade RNA is located on the Mt Shasta Ranger District about 3 air miles northeast of Mt Shasta City and adjacent to, but outside of, the Mt Shasta Wilderness Area. This area encompasses about 2,000 acres, all of which are on National Forest land. Elevations range from about 5,200 to 8,000 feet. Forest cover types are classed as mixed conifer with considerable amounts of Shasta red fir (*Abies magnifica shastensis*)

Planning Status: The Cascade area was proposed as a RNA by the Citizens For Better Forestry in 1987. No field reconnaissance or ecological evaluation has been conducted.

Research Values: The Cascade area was proposed to meet the requirements for the red fir vegetation type (SAF 207) in the Cascade Range Physiographic Province. The Red Butte - Red Fir Ridge RNA also represents the red fir vegetation type.

Resource Conflicts: About 90 percent of the area contains tentatively suitable timber land which could be managed for intensive timber management. This would represent an annual sustained yield of about 710 mbf. The area receives some dispersed recreational use which could conflict with RNA objectives. No livestock grazing takes place.

Figure F-3
Cascade



CASCADE

Cedar Basin

Description: The proposed Cedar Basin RNA is located on the Mt Shasta Ranger District approximately 10 air miles southwest of Mt Shasta City. The area totals about 1,160 acres and lies near the upper headwater of the South Fork of the Sacramento River. Elevations range from 5,400 to 7,100 feet. The proposed area contains Cedar Lake, Cliff Lake, Lower Cliff Lake, Upper Cliff Lake, Terrace Lake, and two unnamed ponds. Forest cover types are generally classed as mixed conifer with a Port-Orford-cedar *Cupressus lawsoniana* (= *Chamaecyparis lawsoniana*) component. Much of the area consists of a myriad of plant communities and vegetative types.

Planning Status: The proposed area was initially screened by a field reconnaissance during the summer of 1980 and subsequently nominated in October 1980. An ecological survey was completed in the summer of 1982.

Research Values: This area best fulfills the Port-Orford-cedar vegetation type (SAF 231) target within the Klamath Mountains Physiographic Province. Other botanic elements represented within this area include the Sierra Nevada mixed conifer (SAF 243) and the Darlingtoniabog vegetation types. The basin contains excellent examples of inland Port-Orford-cedar in both pure and mixed stands from 5,400 to 6,400 feet.

At least two beneficial research objectives could be met (1) because of infestation of many of the coastal Port-Orford cedar stands by *Phytophthora lateralis* and the possibility of further spread in the coastal areas, these stands provide opportunities to protect areas from exposure to the fungus, and (2) these stands are representative of inland Port-Orford cedar that are ecologically and genetically distinct from coastal populations. Protecting this distinct area will provide for the conservation of a wider genetic resource.

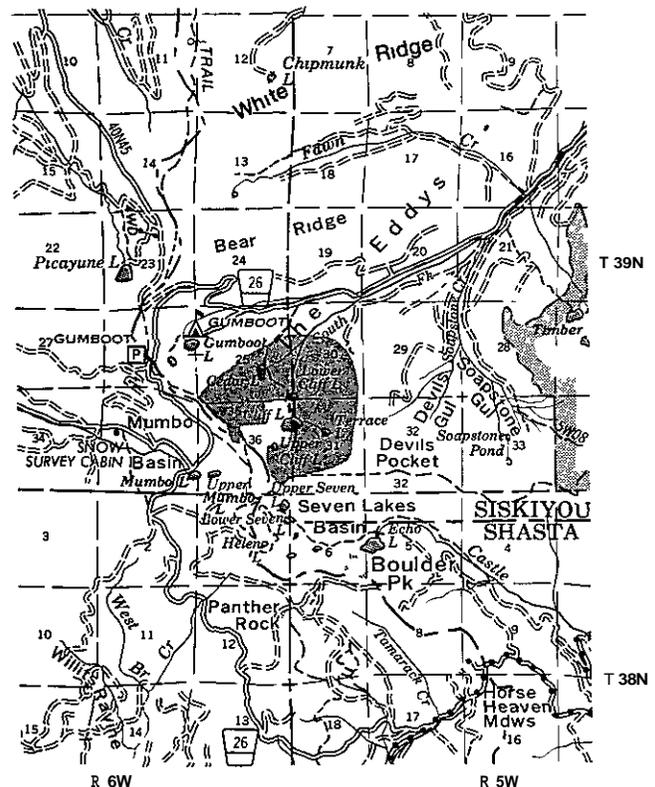
The area includes a large number of plant communities and 11 different species of conifers. It also contains the type locality for the sensitive plant species Klamath manzanita (*Arctostaphylos klamathensis*).

The most significant conflict of the proposed research activities in this area with other land users is with dispersed motorized recreationists and fishermen using the low-grade Cedar Basin road (#39N05Y). This road has also provided a means of access for woodcutting, both permitted and illegal. Keeping this road open provides an avenue for introduction of *Phytophthora lateralis* and the associated threat to Port-Orford cedar in this RNA. Of

lesser impact are recreationists using the Pacific Crest Trail (PCT), which essentially forms the proposed southern boundary of the area. The area is within the South Highland grazing allotment.

Resource Conflicts: Nearly 57 percent of the area contains tentatively suitable timber land which could be managed for intensive timber management. About 260 mbf of potential sustained annual yield would be foregone under RNA designation. The private lands adjacent to the proposed RNA boundary pose a potential conflict. However, the current landowners do not intend to initiate any ground-disturbing developments on their land.

Figure F-4
Cedar Basin



CEDAR BASIN

Devils Rock-Hosselkus

Description: The proposed Devils Rock-Hosselkus RNA is located on the Shasta Lake Ranger District about 24 air miles northeast of Redding. The boundaries of the proposed area include some 5,550 acres. The area can be accessed for research studies by a barely passable jeep road and trail near Chirpchatter Campground. The proposed Devils Rock RNA lies immediately to the east and contiguous to the Hosselkus area. A small portion of the south end of the area also lies within the Shasta Unit of the Whiskeytown-Shasta-Trinity National Recreation Area (NRA).

The proposed area straddles a prominent north-south trending limestone ridge dominated by Brock Mountain on the south and Devils Rock and Brock Butte on the north. This ridge forms the main divide between the Squaw Creek and Pit River watersheds. Elevations range from 1,280 to 3,450 feet just south of Devils Rock. Major perennial streams include Low Pass Creek Canyon, Madison Canyon, Dinner Gulch, and Bars Creek in the Squaw Creek watershed and Susanville Canyon, Brock Creek, and Flat Creek in the Pit River drainage. The vegetative type is generally classed as oak woodland, but there are also other minor cover types within the area including low elevation mixed conifer, canyon riparian, and limestone scrub.

Planning Status: The Devils Rock portion of the area was initially screened by a field reconnaissance during the summer of 1984. No action has been taken since April 1985.

The Hosselkus portion was initially visited by a group of University of California scientists in 1966 and was proposed to the Regional RNA Committee that same year. In December, 1974 the area was nominated by the Committee and recommendations were made to proceed with an ecological evaluation. The ecological evaluation was completed by Virginia and Todd Keeler-Wolf during the summer of 1975.

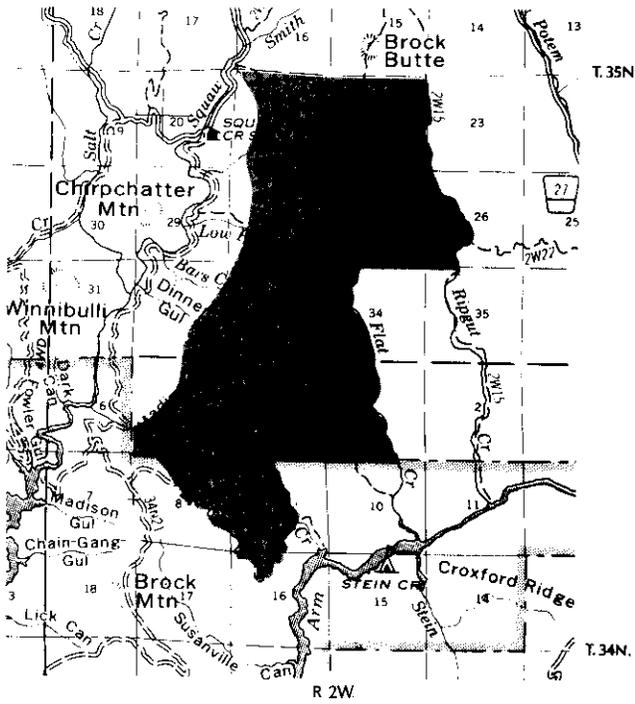
Research Values: The Devils Rock portion of the RNA ideally fulfills the California black oak vegetation type (SAF 246) target within the Klamath Mountains Physiographic Province. The oak stands are dense and result in little diversity of woody shrubs and herbaceous vegetation. Most of the California black oak (*Quercus kelloggii*) trees in this area are 40 to 80 years old, although much older monarchs are present. The complex geology in this area adds to its value as a target vegetation type.

The Hosselkus portion does not specifically meet a designated terrestrial vegetation target. The area was originally proposed primarily for its unique paleontological features which are found in rich abundance in the limestone formations in the heart of the area, and the unique biotic communities which are associated with these habitats. However, in 1992 a new species of shrub in the rose family was discovered growing off of Highway 299 on Hosselkus limestone. The new plant, Shasta snow-wreath (*Nevusia clifforti*), has since been located in two other locations, near or on the border of this RNA. This species, whose closest relative occurs in the southeastern part of the United States, is thought to be a relic from the Arcto-Tertiary geologic period. It is likely that this area will provide many research opportunities. Other endemic species known to occur here are the Shasta eupatory, *Eupatorium shastense*, in the sunflower family, and the Shasta salamander (*Hydromantes shastae*). This amphibian is a Federal Category 2 candidate and a State-listed threatened species. Current scientific thinking indicates that this area may yield other new and previously undescribed plants or animals.

The area also satisfies the secondary vegetation targets for California black oak (SAF 246), Sierra Nevada mixed conifer (SAF 243), and Pacific ponderosa pine/Douglas-fir (SAF 244) types within the Klamath Mountains Physiographic Province. The area has been a focal point for paleontologists since 1895.

Resource Conflicts: Approximately 47 percent of the area contains tentatively suitable timber land which could be managed intensively for timber without adverse impacts on the environment. Potential yields are about 120 mbf per year. However, about one-third of the suitable timber lands consist of hardwood stands. The conifer stands in the area are in small patches and would be costly to harvest and regenerate. Few impacts on dispersed recreation use (mostly hunting) are anticipated by the proposed RNA designation. The area is not used for livestock grazing.

Figure F-5
Devils Rock-Hosselkus



DEVILS ROCK • HOSSSELKUS

Manzanita Creek

Description: The proposed Manzanita Creek RNA is located on the Big Bar Ranger District about 17 air miles west of Weaverville. The area under consideration totals 7,250 acres, all of which are in National Forest ownership. Elevations range from 1,200 to 5,932 feet. The area is bounded on the west by Treloar Ridge and on the east by Manzanita Ridge, it extends from within one mile of the mouth of Manzanita Creek to the head of this stream near Twin Sisters Mountain. Only a small portion of the area is broadly classed as mixed conifer. A large part of the balance of the area consists of shrub and chaparral types, with subalpine chaparral types growing at the higher elevations. The area is within the boundaries of the Trinity Alps Wilderness.

Planning Status: The area was originally proposed for RNA consideration in 1973. An initial field reconnaissance was conducted in October, 1978. The area was subsequently nominated and recommended for ecological survey in early 1979. Taylor and Tease completed the ecological survey in October 1979. The survey was accepted, and in September, 1980, the Regional RNA Committee recommended the area for RNA classification.

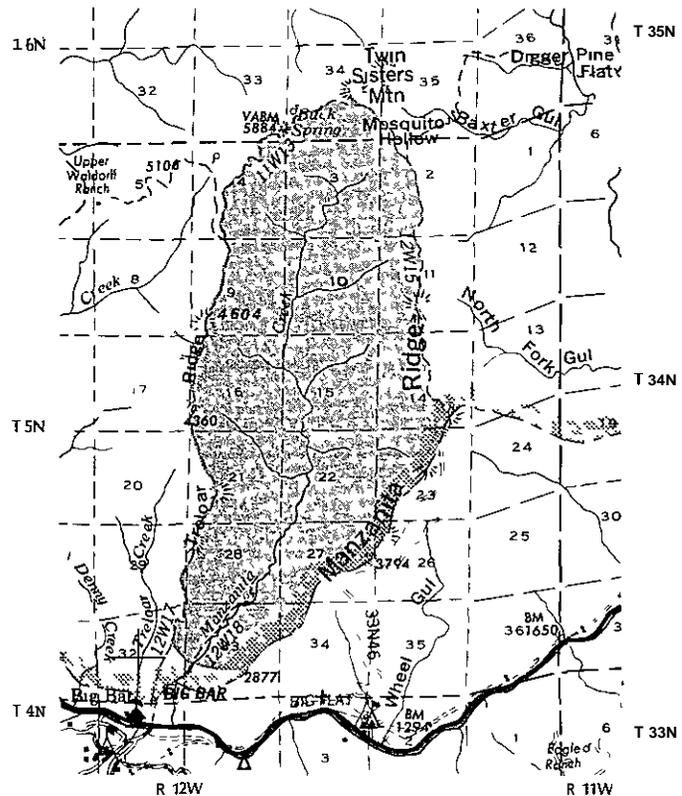
Research Values: The area meets the RNA targets for Pacific ponderosa pine/Douglas-fir (SAF 244) vegetation type for the Klamath Mountains Physiographic Province. The SAF 244 type is also represented by the proposed Smoky Creek area on the Hayfork District. Other target elements represented include white fir (SAF 211), Pacific Douglas-fir (SAF 229), and Sierra Nevada mixed conifer (SAF 243) vegetation types. However, past fires in the area have created a high diversity of subclimax plant communities.

The proposed RNA boundary encompasses an entire watershed, 3,950 acres of which were disturbed by the Treloar Fire of July, 1985. The watershed has a gauging station which would be available for controlled watershed studies.

Resource Conflicts: Recent Congressional designation of the area, as part of the Trinity Alps Wilderness, has eliminated off-highway vehicle (OHV) recreation use along Manzanita Ridge up to as far as the foot of Twin Sisters Mountain. Prescribed burning would no longer be possible except under very special circumstances. There would be some conflicts with Wilderness users, as recreation is not encouraged under a RNA classification. However, the heaviest recreation use would probably remain confined to the outside edges of the area along Treloar and Manzanita Ridges. The area is within the Big Bar grazing

allotment. Although livestock grazing use is light, there could be some conflict between grazing and the objectives of the RNA.

Figure F-6
Manzanita Creek



MANZANITA CREEK

Murphy Glade

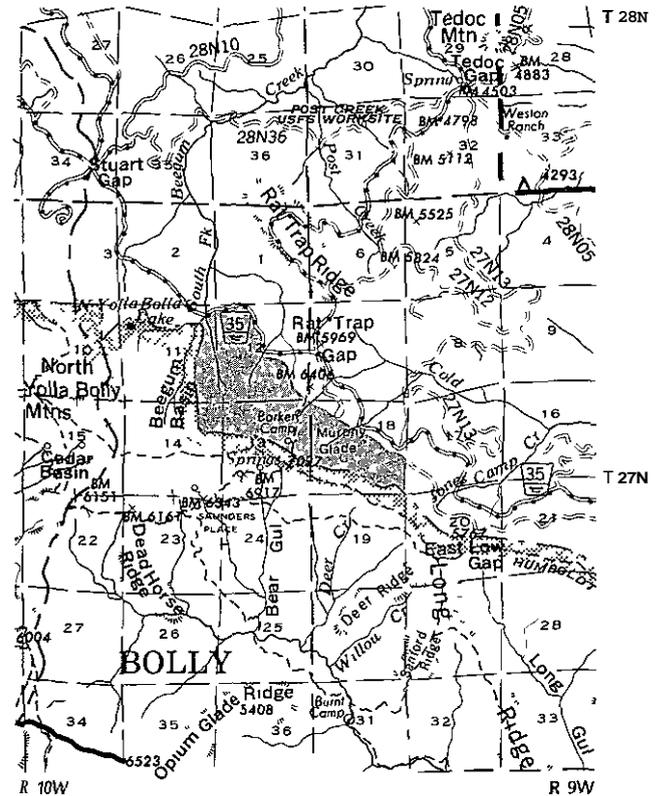
Description: The proposed Murphy Glade RNA is located on the Yolla Bolly Ranger District about 12 air miles south of Platina. This area is adjacent to the Yolla Bolly-Middle Eel Wilderness Area and is about 1,260 acres in size. The entire area is on National Forest land. Elevations range from about 5,600 to 7,200 feet. Forest cover types are classed as mixed conifer with considerable amounts of red fir (*Abies magnifica*).

Planning Status: The Murphy Glade area was proposed as a RNA by the Citizens For Better Forestry in 1987. No field reconnaissance or ecological evaluation has been conducted.

Research Values: The Murphy Glade area was proposed to meet the requirements for the red fir vegetation type (SAF 207) in the Klamath Mountains Physiographic Province.

Resource Conflicts: The area receives some dispersed recreational use, but this should not be a conflict. This area is within the Cold Fork grazing allotment, and livestock grazing could cause a conflict. The area is entirely within LSR so timber management should not be a conflict.

Figure F-7
Murphy Glade



MURPHY GLADE

Mt. Eddy

Description: The proposed Mt Eddy RNA is located on the Mt Shasta Ranger District about nine air miles west of Mt Shasta City. The area totals 890 acres, all of which are on National Forest land. The entire area is within the Mt Eddy Roadless Area which was placed in a "further planning" category. Mt Eddy is being analyzed for both Wilderness and non-wilderness options within this Final EIS (refer to Appendix C). Topographically the area includes a ridge extending south from Mt Eddy, another ridge extending southwest, and a lower ridge to the south of the Deadfall Lakes. Elevations range from 6,400 feet to 9,025 feet at the summit of Mt Eddy.

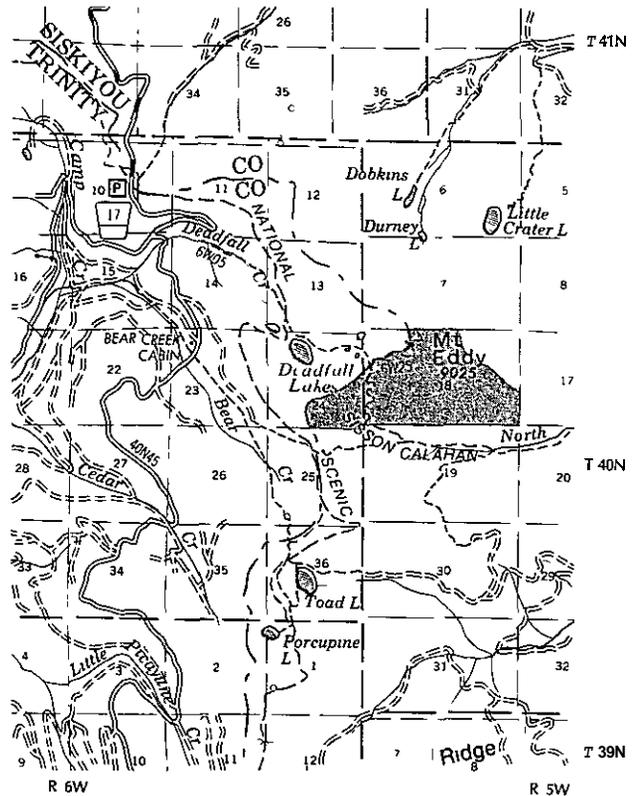
The major feature of this area is Mt Eddy. The vegetation is composed primarily of high elevation open pine forests with sparse rocky slope herbs and a noticeable lack of shrub understory. The most extensive vegetation is a western white pine (*Pinus monticola*) dominated forest. Above the western white pine forest is a nearly pure foxtail pine (*P. balfouriana*) forest.

Planning Status: The area was initially screened through field reconnaissance in 1976. An ecological survey was completed in July, 1978, with acceptance by the Regional RNA Committee in June, 1980. It was recommended that a RNA be established. Because of the RARE II decision to place the Mt. Eddy Roadless Area in a "further planning" status, no further action on the RNA proposal has been taken.

Research Values: The proposed area fulfills the target requirements for foxtail pine for the Klamath Mountains Physiographic Province. The Mt Eddy foxtail pine population covers 240 acres within the proposed RNA. The foxtail pine population is large and healthy and provides an excellent example of this target. The need for this target is high. No other RNA proposals within this physiographic province contain significant populations of foxtail pine. The entire area is botanically exceptional, with a number of sensitive plant occurrences, including the State listed threatened species Tinnity buckwheat (*Eriogonum alpinum*).

Resource Conflicts: There is a trail running through the proposed area, with some insignificant dispersed recreation use taking place. There are no tentatively suitable timber lands within the area. Livestock grazing is sporadic.

Figure F-8
Mt. Eddy



MT. EDDY

Preacher Meadows

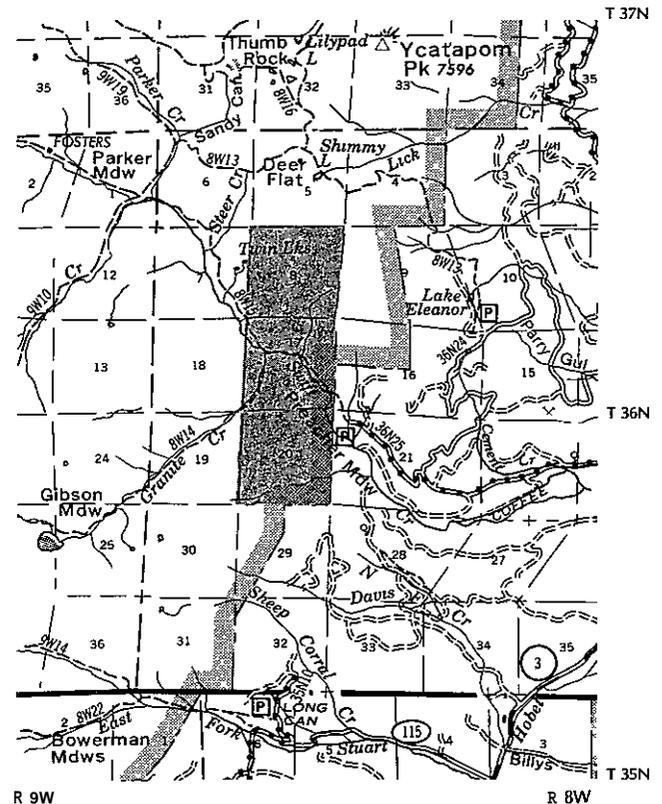
Description: The proposed Preacher Meadows RNA is located on the Weaverville Ranger District about 16 air miles north of Weaverville. The boundaries of the area encompass 1,850 acres, all of which are in National Forest ownership. The entire area is within the boundaries of the Trinity Alps Wilderness. Access is by road up to the eastern edge of the area. Elevations range from 3,800 (along Swift Creek) to 6,100 feet. Forest cover types are broadly classed as mixed conifer, but other non-forest types occur, such as montane chaparral and various bog plant communities. Major features include Swift Creek, Granite Creek, and Preacher Meadows.

Planning Status: It is unknown exactly when the area was reconnoitered. The Regional RNA Committee recommended candidacy for this area and further recommended that an ecological survey be conducted. The ecological survey was completed in July 1978 and accepted by the RNA Committee in July 1980. No further planning has been done.

Research Values: The area meets the Sierra Nevada mixed conifer forest cover type (SAF 243) target for the Klamath Mountains Physiographic Province. The need for this target is moderate to high. Undisturbed samples of adequate size in commercial timber stands are difficult to locate in this province. The *Darlingtonia* bog containing California pitcher plant (*Darlingtonia californica*), as well as the rare orchid California lady's slipper (*Cypripedium californicum*), a Siskiyou Mountains serpentine endemic, add to the value of this area.

Resource Conflicts: The most significant impact of a RNP classification would be on recreationists entering the Trinity Alps Wilderness from the trailhead at the end of the Swift Creek Road. An estimated 1,200 recreation visitor days (RVDs) of use occur in this area annually. Research activities would need to avoid the trail along Swift and Granite Creeks. There is no livestock grazing use.

Figure F-9
Preacher Meadows



PREACHER MEADOWS

Red Butte-Red Fir Ridge

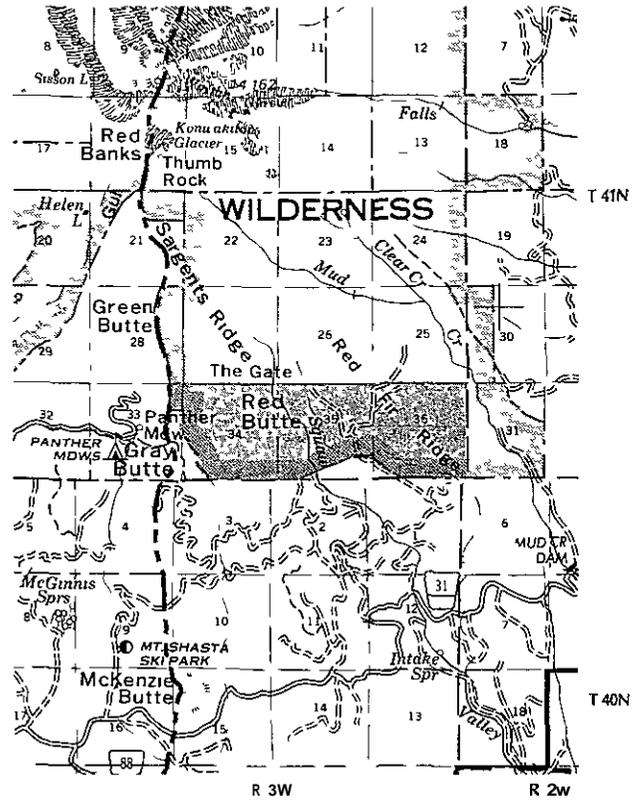
Description: The proposed Red Butte-Red Fir Ridge RNA is located on the McCloud Ranger District on the south slopes of Mt Shasta. It is about 7 miles northeast of Mt Shasta City and 7 miles northwest of McCloud. The area totals 1,640 acres, all of which are on National Forest lands. The total area is within the expanded boundaries of the Mt Shasta Wilderness, as designated by Congress in 1984. Topographically, Red Butte (elevation 8,950 feet) dominates the area, rising more than 400 feet above the surrounding terrain. Elevations range from 7,200 to 8,950 feet. The cover type is generally classed as red fir forest. However, there is some alpine and California mixed subalpine cover type.

Planning Status: The area was originally nominated in July 1973. A field reconnaissance was conducted in July 1981. Due to an obvious scarcity of red fir targets, the area was recommended by the Regional RNA Committee in early 1983 for inclusion in at least one of the alternatives of this Final EIS and for subsequent RNA establishment. An ecological survey is under contract and is due for completion in September, 1988.

Research Values: The area meets the RNA requirements for the red fir vegetation type (SAF 207) in the Cascade Range Physiographic Province. It represents the undisturbed conditions occurring at the higher elevations of the red fir range. A secondary element of the California mixed subalpine forest (SAF 256) is also found within the area. Several populations of the sensitive plant species Wilkins' harebell (*Campanula wilkinsiana*) also occur near or at the borders of this proposed RNA along Swift and Granite Creeks.

Resource Conflicts: Because of the 1984 designation of the Mt Shasta Wilderness, resource conflicts will be limited to possible impacts on wilderness and primitive recreation opportunities. Recreation use within the area is sporadic. Some dispersed camping occurs at Squaw Valley Creek Meadows, but this is outside the proposed boundaries of the area. There is no livestock grazing use.

Figure F-10
Red Butte-Red Fir Ridge



RED BUTTE • RED FIR RIDGE

Rough Gulch

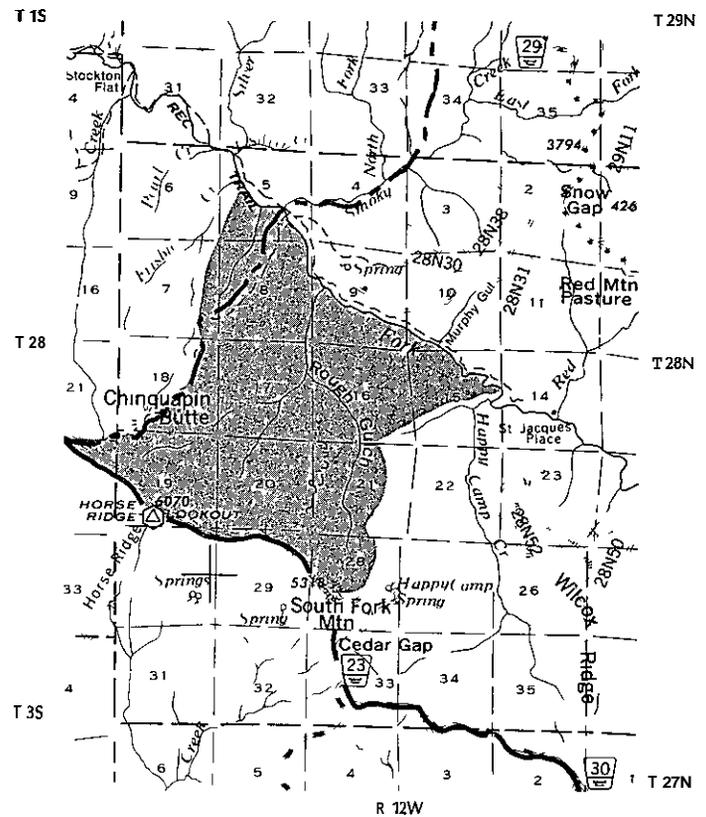
Description: The proposed Rough Gulch RNA is located on the Yolla Bolla Ranger District about 19 air miles south of Hayfork. The area under consideration totals 3,961 acres, all of which are on National Forest land. Elevation range from 2,540 to 6,070 feet. The proposed area includes an area which is being proposed for establishment as a RNA - South Fork Mountain. The Rough Gulch area includes a broad-topped, moderately sloping ridge known locally as Chinquapin Ridge, it also includes the steep-sloping lands within Rough Gulch and portions along the South Fork Trinity River. The Rough Gulch inner gorge and portions along the South Fork Trinity River are very steep (60-80 percent slopes), they contain significant areas of mass instability. Forest cover types are generally classed as mixed conifer with Douglas-fir (*Pseudotsuga menziesii*) and golden chinquapin (*Castanopsis chrysophylla*) components.

Planning Status: The proposed area was initially screened by a field reconnaissance conducted on May 9, 1981. Further field evaluation was made in the fall of 1984 by Todd Keeler-Wolf. The boundary for this proposal was recommended by Todd Keeler-Wolf to include what he considered the best representation of the target type.

Research Values: The proposed Rough Gulch RNA area contains a Douglas-fir/giant chinquapin/beargrass community which appears to be uniquely different from the communities within the Pacific Douglas-fir vegetation type (SAF 229) represented by the contiguous, proposed South Fork Mountain RNA. Many of the individual chinquapins in the area are in excess of 3 feet diameter at breast height and 100 feet or more tall. The area would meet the target requirements for the Pacific Douglas-fir vegetation type (SAF 229) for the Klamath Mountains Physiographic Province. The area has secondary targets which are representative of the Pacific ponderosa pine/Douglas-fir vegetation type (SAF 244) and the aforementioned beargrass community.

Resource Conflicts: There are no locatable mineral values within the candidate area. Dispersed recreation uses along the South Fork Trinity River are topographically isolated from most of the proposed area and would pose no impacts now or in the future. There is a road to a private inholding in sections 20 and 21 not shown on the map. Much of the area is either within extremely unstable landscapes (inner gorges) or within the territory of a known nest site of the northern spotted owl, a threatened species. There is no livestock grazing within this area.

Figure F-11
Rough Gulch



ROUGH GULCH

Smoky Creek

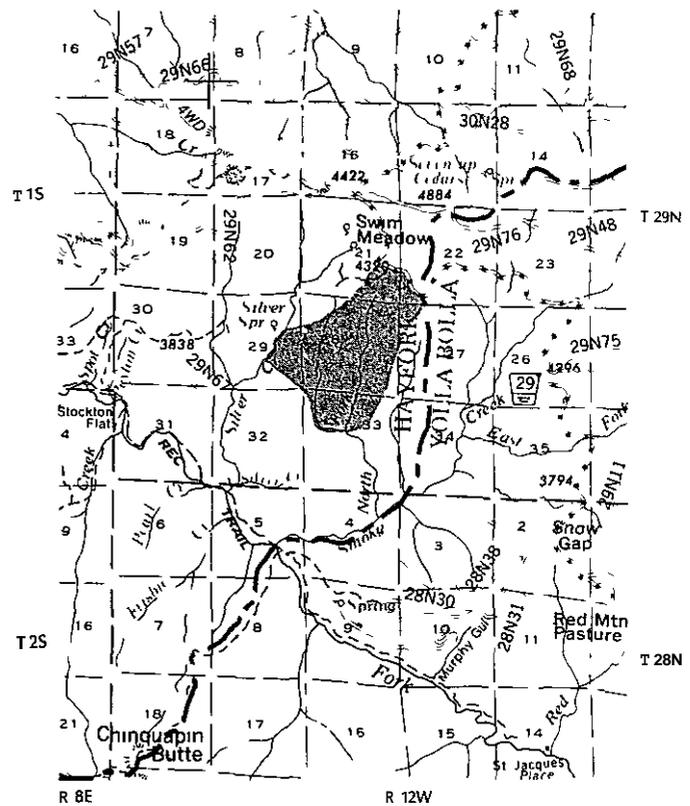
Description: The proposed Smoky Creek RNA is located on the Hayfork Ranger District about 16 air miles south of Hayfork. The area encompasses some 960 acres, all of which are in National Forest ownership. The area lies within the Smoky Creek drainage, a tributary to the South Fork Trinity River. The area is easily accessible by Forest roads and the Smoky Creek trail which crosses the middle of the area. Elevations range from 3,200 to 4,200 feet. The forest cover type is generally classed as mixed conifer.

Planning Status: The area was initially screened through aerial reconnaissance conducted in October, 1978. It was recommended for candidacy by the Regional RNA Committee in November, 1978. An ecological survey was completed in October, 1979, and subsequently accepted by the RNA Committee in September, 1980, with a recommendation for RNA establishment.

Research Values: The proposed area meets the RNA target for Pacific ponderosa pine/Douglas-fir (SAF 244) in the Klamath Mountains Physiographic Province. A secondary target, the Jeffrey pine type (SAF 247), is also represented and may well be needed as a primary target for the network. There are indications through the official file and area reports that the low density of the over-mature overstory is a disadvantage in the proposed area. This type is also represented by the proposed Manzanita Creek RNA.

Resource Conflicts: Most of the proposed area contains tentatively suitable timber land which could be managed intensively for timber without adverse impacts on the environment. Potential yields are about 356 mbf per year. The area is used very little other than for sporadic uses in the hunting season. This area is within the Post Creek grazing allotment, livestock grazing is incidental.

Figure F-12
Smoky Creek



SMOKY CREEK

South Fork Mountain

Description: The proposed South Fork Mountain RNA is located on the Yolla Bolla Ranger District about 20 air miles south of Hayfork. The area totals 1,180 acres all of which are in National Forest ownership. The proposed RNA lies on the lower and midslopes of South Fork Mountain along the South Fork Trinity River. Elevations range from about 3,100 to 4,200 feet. The aspect is generally northeasterly in the lower portions of the Happy Camp Creek drainage. About 1.5 miles of the South Fork Trinity River and nearly all of Happy Camp Creek are included in the area. A large portion of this area contains highly unstable, over-steepened landscapes (inner-gorges). The major forest type is Douglas-fir with minor components of white fir.

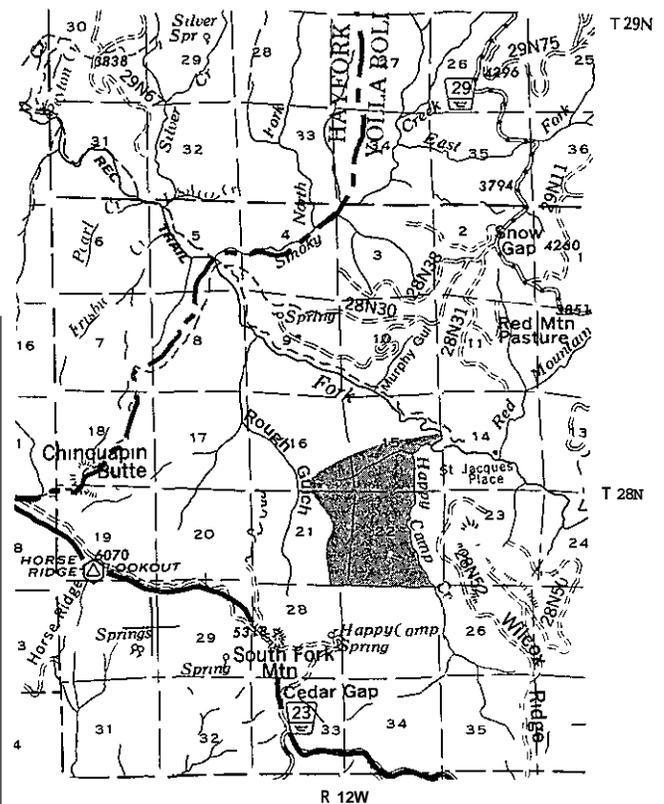
Planning Status: The area was initially proposed for RNA evaluation in 1973. In May, 1974, the area was initially screened by a field reconnaissance. The area was subsequently nominated by the Regional RNA Committee. An ecological survey was conducted by Dean Taylor during the summer of 1975. The latter survey was accepted by the RNA Committee, and work was initiated on the RNA establishment Environmental Analysis (EA).

A preliminary draft of this EA was completed in December 1977. The EA was in the process of being revised when planning began under the Second Roadless Area Review and Evaluation (RARE II). This was followed by the California vs. Berglund lawsuit which arose over the decisions in the Final Environmental Impact Statement (Final EIS) for RARE II, issued in 1979. All further work on the RNA establishment EA was suspended until Congress or administrative action, through the National Forest Management Act (NFMA) planning process, resolved the issues in the lawsuit. In 1984, Congress enacted the California Wilderness Act, releasing this area (which was within the Chinquapin Roadless Area) for non-wilderness resource uses.

Research Values: The area meets the Pacific Douglas-fir vegetation (SAF 229) target for the Klamath Mountains Physiographic Province. No sensitive plants are known to grow in this area. This target can also be satisfied in another area proposed for RNA establishment - Rough Gulch.

Resource Conflicts: The boundaries of this area were adjusted to minimize impacts on future use of the adjacent Rough Gulch area. Intrusions by man along the South Fork Trinity River would be minimal. Recreation use within the area is extremely light. There is no livestock grazing use.

Figure F-13
South Fork Mountain



SOUTH FORK MOUNTAIN

Stuart Fork

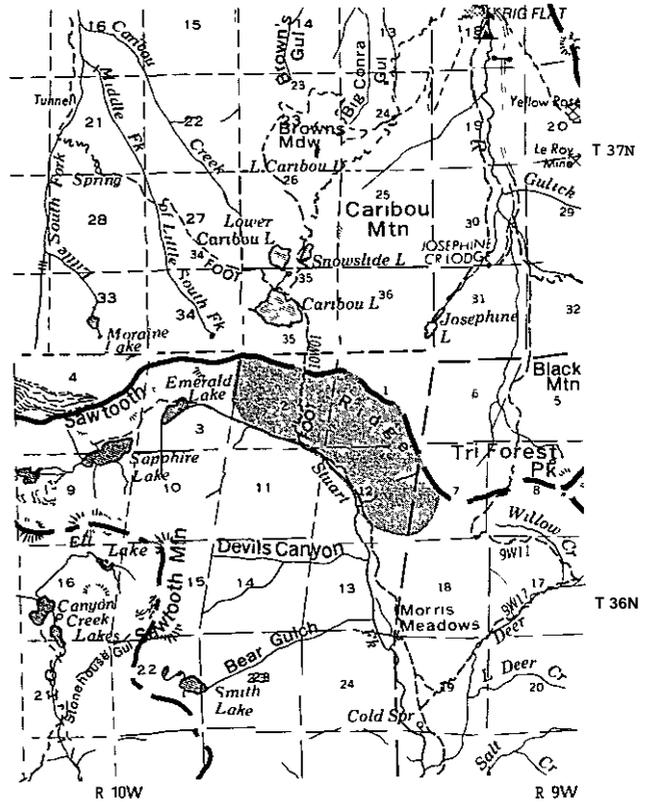
Description: The proposed Stuart Fork RNA is located on the Weaverville Ranger District about 18 miles north of Weaverville. The area totals 1,500 acres, all of which are in National Forest ownership. The area lies within the Trinity Alps Wilderness. Access to the area is difficult, limited to a trail up the Stuart Fork valley. The entire area lies on the southerly and southwesterly-facing slopes below Sawtooth Ridge. Numerous perennial streams and springs originate within the area. Emerald Lake and Stuart Fork are adjacent to the boundaries of the proposed area. Elevations range from 4,500 feet near Morns Meadows to 7,600 feet at the summit of Sawtooth Ridge. The major cover type in the area is subalpine shrub, consisting of montane chaparral.

Planning Status: The area was proposed for RNA consideration in 1984. No field reconnaissance has been done.

Research Values: The area appears to meet the targets for montane chaparral for the Klamath Mountains Physiographic Province. Good examples of this vegetation type are extremely difficult to find in suitable sizes and in an undisturbed state. The major drawback with this area is the difficult access. Conversely, location of the area within the Trinity Alps Wilderness would maintain the undisturbed conditions found here.

Resource Conflicts: Little conflict with primitive recreation uses in the Trinity Alps Wilderness is anticipated. The majority of the montane chaparral type lies almost one-fourth mile away from the Stuart Fork Trail. A steep trail, connecting the Stuart Fork valley with Canbou Lake on the Klamath National Forest, crosses through the area but is seldom used by hikers. There is no livestock grazing in this area.

Figure F-14
Stuart Fork



STUART FORK

Appendix C

Fish, Wildlife, and Botany Habitat Management

APPENDIX G

Fish, Wildlife, and Botany Habitat Management

General Discussion

Four major concepts have been used in the assessment of the effects of the various alternatives described in this Final Environmental Impact Statement (Final EIS) upon fish and wildlife populations and habitats: (1) fish and wildlife assemblages as management indicator, (2) viable populations, (3) diversity, and (4) standards and guidelines. The latter is discussed in Chapter II of the Final EIS, and in the accompanying Forest Plan.

Management indicator, viable populations, and diversity are treated as interrelated concepts. Wildlife and fish populations and habitats are ultimately affected by various levels of management practices applied to an ecosystem, (i.e., the Shasta-Trinity National Forests).

Viable Populations. A viable population for all species is defined as a population capable of maintaining itself over time in the face of anticipated environmental changes, both natural and human-caused. It is not a maximum or a desired population level. Instead, it is the level below which the population is considered to be subject to local elimination due to habitat loss or alteration, disease, disturbance, or some other factor. Threatened or endangered species are considered to be below viable levels.

The development and application of the Forest standards and guidelines is intended to help provide for viability of the Forests' species. The primary mechanism for maintaining viability is through providing a sufficient amount and distribution of habitat types, seral stages, and special habitat components over time.

Application Of The Concepts

It is important to note that management prescriptions and Forest-wide standards and guidelines are written with the intent that they provide for minimum levels of habitat diversity and viable populations of species, regardless of how these prescriptions are assigned by alternative to the land base.

Individual land allocations were made for selected key habitat areas for the following species and/or species groups: bald eagle (endangered), peregrine falcon (en-

dangered), spotted owl (threatened), goshawk (sensitive), black bear, deer, and sensitive plants. For each of these species, geographical areas have been identified for special management for protection and/or enhancement of their habitats. The amount of area allocated varies by alternative.

Land allocations are actually prescriptions for management. Each prescription has a set of standards and guidelines to be applied directly within the prescription or through application of Forest-wide standards and guidelines.

Fish, Wildlife and Botany Programs

Management of the wildlife, fisheries and botany programs on the Forests occurs through two primary efforts: (1) direct management which includes the hands-on management, protection or manipulation of a species and/or its habitat, and (2) indirect management, which is the mechanism through which input is provided to proposed projects (i.e., timber sales) which have the potential to affect the species and/or its habitat. Indirect management includes inventory of known populations and their habitats, reconnaissance for potentially affected populations and/or habitats in project areas, mitigation of impacts, and protection of individual species and habitats.

A general overview for existing and future management of the Forests' wildlife, fisheries and botany programs is displayed in **Figure G-3**. This figure indicates that general management direction can be applied to four categories: (1) T&E and sensitive, (2) consumptive, (3) non-consumptive, and (4) special habitats. All of the species habitats can be placed into one or more of these categories and managed accordingly. The remaining figures show the various management groups by specific species and the framework for individual species habitat improvement projects.

The total magnitude of this program, based on five year plan projections, would be at the \$4 million level, not including partnerships.

Fish and Wildlife Tables and Figures

The following tables and figures are part of this appendix

Table G-1 - Fish Species Assemblages

Table G-2 - T&E Species

Table G-3 - Wildlife Species Assemblages

Table G-4 - Sensitive and Endemic Plants

Figure G-1 - Seral Stage Descriptions

Figure G-2 - Figure has been dropped

Figure G-3 - Wildlife/Fisheries/Botany Programs

Figure G-4 - Wildlife

Figure G-5 - Wildlife Program

Figure G-6 - Fisheries

Figure G-7 - Fisheries Program

Figure G-8 - Botany

Figure G-9 - Botany Programs

Fish and Wildlife Assemblages as Management Indicators

The basis for the selection of wildlife species was the North Cascades Zone Wildlife Habitat Relationships (WHR) program. The WHR program displays species needs and habitat use by Kuchler vegetation type by seral stage and by special habitat requirements. The relative value of the seral stages for breeding, feeding, and resting by each of the Forests' species is displayed in the WHR program.

Selection of management indicators was based on how well a species met the following: (1) species of primary emphasis on the Forests' harvest species or threatened, endangered or sensitive species, (2) potential for a species within a group to be impacted by the Forests' land management activities, (3) the degree to which a species' biological potential is dependent on the aquatic habitat within National Forest lands, and (4) how well a species represents the habitat requirements for a species management group.

The basic intent of this concept is that by providing suitable habitat for management indicators the habitat needs of all other species would be provided. To provide for these needs, standards and guidelines were developed for management and protection of special habitat com-

ponents. Forest management under the National Forest Management Act of 1976 (NFMA) must provide for the monitoring of management indicators. The feasibility of monitoring, including biological factors and logistics, was considered in the management indicator selection process.

Table G-1 Fish Species Assemblages

Management indicators were generally selected based on three criteria: (1) extent of basin-wide or Forest-wide distribution, (2) extent of Forest Service management developments that could potentially benefit or impact the indicator species and (3) the intensity of public interest for the recognition of a group of fish.

The listed fish species, except for the bull trout, occupy habitats that can be impacted by Forest Service management activities.

Two fish species (redband trout and rough sculpin) were not selected as management indicators for their respective assemblages for the following reasons:

Redband Trout. The redband trout was not selected as a management indicator species because of low reproductive numbers, limited instream system distribution, and the large contingency of private ownership adjacent to redband trout streams.

Rough Sculpin. Fisheries investigation by BioSystems Analysis, Inc., in 1983 and 1984 in the Pit River system, located rough sculpin in aquatic habitats on private lands and Lassen National Forest administered lands, but not on the Shasta-Trinity National Forests. These investigations indicated the presence of Pit and Marbled sculpin, but not the rough sculpin. Therefore, the rough sculpin was not selected as a management indicator.

Several assemblages were combined to form three assemblages discussed here. These are the anadromous fish assemblage, inland coldwater fish assemblage, and the inland warmwater fish assemblage.

Anadromous Fish Assemblage

Inland Coldwater Sportfish
Inland Threatened, Endangered and Sensitive Sportfish
Inland Coldwater Nongame Fish

Inland Warmwater Fish Assemblage

Inland Warmwater Sportkh
 Inland Warmwater Nongame Fish

Anadromous **Commercial/Recreational** Sportfish

Group Representatives:

- Coho
- Fall-Run Chinook
- Spring-Run Chinook
- Winter-Run Steelhead

Group MIS Representative:

- Spring-Run Chinook (South Fork Trinity River only)
- Winter-Run Steelhead

California Species of Special Concern on the Shasta-Trinity National Forests:

- Coho (*Oncorhynchus kisutch*) [C3]
- Fall-Run Chinook (*Oncorhynchus tshawytscha*) [C2]
- Spring-Run Shinook (*Oncorhynchus mykiss gairdneri*) [C5]

Anadromous Threatened, Endangered, & Sensitive Sportfish

Group Representative:

- Spring-Run [Summer] Steelhead

Group MIS Representative:

- Spring-Run [Summer] Steelhead (South Fork Trinity River only)

California Species of Special Concern on the Shasta-Trinity National Forests:

- Spring-Run [Summer] Steelhead (*Oncorhynchus mykiss gairdneri*) [C 1]

Anadromous Nongame Fish

Group Representative:

Pacific Lamprey

Group MIS Representative:

None identified

California Species of Special Concern on the Shasta-Trinity National Forests:

- Sea-Run Pacific Lamprey (*Lampetra tridentata tridentata*) [C5]

Inland Coldwater Sportfish

Group Representatives:

- Brook Trout
- Brown Trout
- Rainbow Trout

Group MIS Representative:

Rainbow Trout

California Species of Special Concern on the Shasta-Trinity National Forests:

- Resident Rainbow Trout (*Oncorhynchus mykiss gairdneri*) [C5]

Inland Threatened, Endangered, & Sensitive Sportfish

Group Representatives:

- Bull Trout
- Redband Trout [Emphasis Species]

Group MIS Representative:

None identified

California Species of Special Concern on the Shasta-Trinity National Forests:

Appendix G - Fish, Wildlife, & Botany Habitat Management

Bull Trout (*Salvelinus confluentus*) [extinct]
McCloud River Redband Trout (*Oncorhynchus mykiss* ssp)
[C3]

Inland Coldwater Nongame Fish

Group Representative:

Rough Sculpin

Group MIS Representative:

None identified

California Species of Special Concern on the Shasta-Trinity National Forests:

Klamath Smallscale Sucker (*Catostomus nmiculus*) [C5]
Klamath Speckled Dace (*Rhinichthys osculus klamathensis*)
[C5]
Riffle Sculpin (*Cottus gulosus*) [C5]
Rough Sculpin (*Cottus asperimus*) [ST]
Sacramento Hrtch (*Lavinia exilicauda ecalicauda*) [C5]

Inland Warmwater Sportfish

Group Representatives:

Largemouth Bass
Smallmouth Bass

Group MIS Representative:

Largemouth Bass

California Species of Special Concern on the Shasta-Trinity National Forests:

None identified

Inland Warmwater Nongame Fish

Group Representative:

None identified

Group MIS Representative:

None identified

Species of Special Concern Classification

Class 1 Species [C1]

These are taxa that seem to conform to the state definitions for threatened or endangered species. They should be added to the official list (i.e., spring-run [summer] steelhead)

Class 2 Species [C2]

These are taxa having populations that are low, scattered, or highly localized. Their populations have declined in abundance in recent years, and they require management to prevent them from becoming threatened species (i.e., spring-run chinook)

Class 3 Species [C3]

These are uncommon taxa occupying much of their natural range. They were formerly more abundant, but they still have pockets of abundance within their range. These species should be monitored periodically to see if their decline is accelerating. Taxa with very restricted, but stable, distributions are also included here, (i.e., Coho salmon and McCloud River redband trout)

Class 4 Species [C4]

These fishes have declined in abundance within their natural range, but they have been introduced and established in greater numbers outside their native range. Special management is required to prevent loss of native populations.

Class 5 Species [C5]

These are common or widespread taxa whose populations appear stable or increasing in the face of habitat alterations, (i.e., resident rainbow trout and winter-run steelhead)

Table G-2
Threatened, Endangered, and Sensitive Species on the
Shasta-Trinity National Forests'

Amphibians

California red-legged frog (*Rana aurora draytoni*) - FC2
 Shasta salamander (*Hemidactylium sp.*) - ST

Birds

bald eagle (*Haliaeetus leucocephalus*) - FE, SE
 peregrine falcon (*Falco peregrinus*) - FE, SE
 spotted owl (*Strix occidentalis*) - FT
 goshawk (*Accipiter gentilis*) - FS
 willow flycatcher (*Empidonax traillii*) - FS

Fishes

bull trout (*Salvelinus confluentus*) State extinct
 McCloud River redband trout (*Oncorhynchus mykiss*) - ST
 emphasis
 rough sculpin (*Cottus asperimus*) - ST
 spring-run chinook salmon (*Oncorhynchus tshawytscha*) - ST
 emphasis
 spring-run steelhead (*Oncorhynchus mykiss*) - FS

Mammals

Pacific western big eared bat (*Plecotus townsendii*) - FC2
 martin (*Martes americana*) - FS
 fisher (*Martes pennanti*) - FS
 Sierra Nevada red fox (*Vulpes fulva*) - ST, FS (may not occur
 on the Shasta-Trinity National Forests)
 White-footed vole (*Arborimus albipes*) - FC2

Invertebrates

Franklin's bumble bee (*Bombus franklini*) - FC2
 Klamath Mountains ground beetle (*Nebria sahlbergii trias*) - FC2
 Siskiyou ground beetle (*Nebria gebleri siskiyouensis*) - FC2
 Trinity bristle snail (*Monadenia setose*) - ST

- * FE = Federally Endangered
- FT = Federally Threatened
- FC2 = Federal Candidate 2
- SE = State Endangered
- ST = State Threatened
- FS = Forest Service Sensitive
- S-T Emphasis = Shasta-Trinity National Forest Emphasis

Table G-3
Wildlife Species Assemblages as Management Indicators

The following lists are of species assemblages or species that are highly associated with the habitats and habitat components on the Shasta-Trinity National Forests (see literature references on the last page of this Appendix) ** Indicates the species recommended for monitoring

Aquatic habitats in general (Species can use either fast or slow water components)*

Common Name	Scientific Name
Olympic salamander	<i>Rhyacotriton olympicus</i>
** black solomander	<i>Aneides flavipunctatus</i>
common goldeneye	<i>Bucephala clangula</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
bufflehead	<i>Bucephala albeola</i>
hooded merganser	<i>Lophodytes cucullatus</i>
common merganser	<i>Mergus merganser</i>
osprey	<i>Pandion haliaetus</i>
bold eagle	<i>Haliaeetus leucocephalus</i>
spotted sandpiper	<i>Actitis macularia</i>
ring billed gull	<i>Larus delawarensis</i>
California gull	<i>Larus californicus</i>
herring gull	<i>Larus argentatus</i>
Caspian tern	<i>Sterna caspia</i>
Forster's tern	<i>Sterna forsteri</i>
belted kingfisher	<i>Ceryle alcyon</i>
cliff swallow	<i>Hirundo pyrrhonota</i>
beaver	<i>Castor canadensis</i>
muskkrat	<i>Ondatra zibethicus</i>
river otter	<i>Lutra canadensis</i>

Fast moving aquatic habitat only (Fast water required, usually indicates river or stream habitats)*

Common Name	Scientific Name
Pacific giant solomander	<i>Dicamptodon ensatus</i>
toiled frog	<i>Ascaphus truei</i>
Foothill yellow-legged frog	<i>Rana boylei</i>
American dipper	<i>Cinclus mexicanus</i>

Slow moving aquatic habitats only (Areas of slow water required, ton occur in lacustrine or riverine habitats)*

Common Name	Scientific Name
Northwestern solomander	<i>Ambystoma gracile</i>
long-toed solomander	<i>Ambystoma macrodactylum</i>
rough-skinned newt	<i>Taricha granulosa</i>
California newt	<i>Taricha torosa</i>

Western toad
 Pacific treefrog
 **California red-legged frog
 **Northern red-legged frog
 Cascades frog
 bullfrog
 common loon
 pied-billed grebe
 horned grebe
 eared grebe
 Western grebe/ Clark's grebe
 double-crested cormorant
 American bittern
 great blue heron
 great egret
 green-backed heron
 black-crowned night heron
 tundra swan
 Canada goose
 woad duck
 green winged teal
 mallard
 Northern pintail
 cinnamon teal
 Northern shoveler
 gadwall
 American wigeon
 canvasback
 redhead
 ring-necked duck
 greater scaup
 lesser scaup
 ruddy duck
 Virginia rail
 sora
 American coot
 Bonaparte's gull
 marsh wren
 Western pond turtle

Bufo boreas
Hyla regilla
Rana aurora draytoni
Rana aurora aurora
Rana cascadae
Rana catesbeiana
Gavia immer
Podilymbus podiceps
Podiceps auritus
Podiceps nigricollis
Aechmophorus occidentalis/Clarkii
Phalacrocorax auritus
Botaurus lentiginosus
Ardea herodias
Casmerodius albus
Butorides striatus
Nycticorax nycticorax
Cygnus columbianus
Branta canadensis
Anas sponsa
Anas crecca
Anas platyrhynchos
Anas acuta
Anas cyanoptera
Anas clypeata
Anas strepera
Anas americana
Aythya valisineria
Aythya americana
Aythya collaris
Aythya marila
Aythya affinis
Oxyura jamaicensis
Rallus limicola
Porzana carolina
Fulica americana
Larus philadelphia
Cistothorus palustris
Clemmys marmorata

Riparian vegetation (species are associated with riparian vegetation, valley foothill riparian (VRI) or montane riparian (MRI))

Common Name	Scientific Name
toiled frog	<i>Ascaphus truei</i>
Pacific treefrog	<i>Hyla regilla</i>
**California red-legged frog	<i>Rana aurora draytoni</i>
**Northern red-legged frog	<i>Rana aurora aurora</i>
green-backed heron	<i>Butorides striatus</i>
black-crowned night heron	<i>Nycticorax nycticorax</i>
sharp-shinned hawk	<i>Accipiter striatus</i>
red-shouldered hawk	<i>Buteo lineatus</i>
merlin	<i>Falco columbarius</i>

Appendix G - Fish, Wildlife, & Botany Habitat Management

Common Name	Scientific Name
peregrine falcon	<i>Falco peregrinus</i>
ruffed grouse	<i>Bonasa umbellus</i>
**turkey	<i>Meleagris gallopavo</i>
mourning dove	<i>Zenaidura macroura</i>
black-throated green hummingbird	<i>Archilochus alexandri</i>
rufous hummingbird	<i>Selasphorus rufus</i>
belted kingfisher	<i>Ceryle alcyon</i>
red-breasted sapsucker	<i>Sphyrapicus ruber</i>
Nuttall's woodpecker	<i>Picoides nuttallii</i>
Western wood-pewee	<i>Contopus sordidulus</i>
**willow flycatcher	<i>Empidonax traillii</i>
Western Flycatcher	<i>Empidonax difficilis</i>
black phoebe	<i>Sayornis nigricans</i>
purple martin	<i>Progne subis</i>
**tree swallow	<i>Tachycineta bicolor</i>
violet-green swallow	<i>Tachycineta thalassina</i>
black-throated blue chickadee	<i>Parus atricapillus</i>
house wren	<i>Troglodytes aedon</i>
winter wren	<i>Troglodytes troglodytes</i>
Swainson's thrush	<i>Catharus ustulatus</i>
hermit thrush	<i>Catharus guttatus</i>
yellow warbler	<i>Dendroica petechia</i>
MacGillivray's warbler	<i>Oporornis tolmiei</i>
common yellowthroat	<i>Geothlypis trichas</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
yellow-breasted chat	<i>Icteria virens</i>
black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Lincoln's sparrow	<i>Melospiza lincolni</i>
red-winged blackbird	<i>Agelaius phoeniceus</i>
brown-headed cowbird	<i>Molothrus ater</i>
hooded oriole	<i>Icterus cucullatus</i>
Northern oriole	<i>Icterus galbula</i>
Virginia opossum	<i>Didelphis virginiana</i>
vogrant shrew	<i>Sorex vagrans</i>
water shrew	<i>Sorex palustris</i>
small-footed myotis	<i>Myotis leibii</i>
mountain beaver	<i>Aplodontia rufa</i>
beaver	<i>Castor canadensis</i>
black rat	<i>Rattus rattus</i>
Western jumping mouse	<i>Zapus princeps</i>
raccoon	<i>Procyon lotor</i>
mink	<i>Mustela vison</i>
river otter	<i>Lutra canadensis</i>
common garter snake	<i>Thamnophis sirtalis</i>
Western terrestrial garter snake	<i>Thamnophis elegans</i>
Western aquatic garter snake	<i>Thamnophis couchii</i>

Chaparral Community (Species associated with the following WHR types ADS, BBR, MCP, MCH, CRC)

Common Name	Scientific Name
gray flycatcher	<i>Empidonax wrightii</i>
wren-tit	<i>Chamaea fasciata</i>
California thrasher	<i>Toxostoma redivivum</i>
water pipit	<i>Anthus spinoletta</i>
**green-tailed towhee	<i>Pipilo chlorurus</i>
brown towhee	<i>Pipilo fuscus</i>
sage sparrow	<i>Amphispiza belli</i>
pallid bat	<i>Antrozous pallidus</i>
Nuttall's cottontail	<i>Sylvilagus nuttalli</i>
Sonoma chipmunk	<i>Tamias sonomae</i>
Great Basin pocket mouse	<i>Perognathus parvus</i>
brush mouse	<i>Peromyscus boylii</i>
gray fox	<i>Urocyon cinereoargenteus</i>
**mule deer	<i>Odocoileus hemionus</i>
sagebrush lizard	<i>Sceloporus graciosus</i>
California whipsnake	<i>Masticophis lateralis</i>
striped whipsnake	<i>Masticophis taeniatus</i>

Hardwoods (Habitat types VFH, VHC, MHW, MHC, ASP Oaks, madrone, aspen)

Common Name	Scientific Name
great egret	<i>Casmerodius albus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
band-tailed pigeon	<i>Columba fasciata</i>
Allen's hummingbird	<i>Selasphorus sasin</i>
**acorn woodpecker	<i>Melanerpes formicivorus</i>
downy woodpecker	<i>Picoides pubescens</i>
scrub jay	<i>Aphelocoma coerulescens</i>
plain titmouse	<i>Parus inornatus</i>
white-breasted nuthatch	<i>Sitta carolinensis</i>
Hutton's vireo	<i>Vireo huttoni</i>
warbling vireo	<i>Vireo gilvus</i>
house sparrow	<i>Passer domesticus</i>
Western gray squirrel	<i>Sciurus griseus</i>
wild pig	<i>Sus scrofa</i>

Open habitat in general (Species can be associated with meadows, open areas, seral stages 1, 2 and 3a and WHR types PGS, AGS, WTM)**

Common Name	Scientific Name
turkey vulture	<i>Cathartes aura</i>
golden eagle	<i>Aquila chrysaetos</i>
California quail	<i>Callipepla californica</i>
mountain quail	<i>Oreortyx pictus</i>
**Western screech owl	<i>Otus kennicottii</i>
great horned owl	<i>Bubo virginianus</i>

Appendix G - Fish, Wildlife, & Botany Habitat Management

Common Name	Scientific Name
common nighthawk	<i>Chordeiles minor</i>
common poorwill	<i>Phalaenoptilus nuttallii</i>
Vaux's swift	<i>Chaetura vauxi</i>
Calliope hummingbird	<i>Stellula calliope</i>
rufous hummingbird	<i>Selasphorus rufus</i>
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>
Clark's nutcracker	<i>Nucifraga columbiana</i>
black-billed magpie	<i>Pica pica</i>
American crow	<i>Corvus brachyrhynchos</i>
common raven	<i>Corvus corax</i>
rock wren	<i>Salpinctes obsoletus</i>
Western bluebird	<i>Sialia mexicana</i>
chipping sparrow	<i>Spizella passerina</i>
Vesper sparrow	<i>Pooecetes gramineus</i>
**song sparrow	<i>Melospiza melodia</i>
golden-crowned sparrow	<i>Zonotrichia aticapilla</i>
dark-eyed junco	<i>Junco hyemalis</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>
house finch	<i>Carpodacus mexicanus</i>
pine siskin	<i>Carduelis pinus</i>
lesser goldfinch	<i>Carduelis psaltria</i>
American goldfinch	<i>Carduelis tristis</i>
little brown myotis	<i>Myotis lucifugus</i>
long-eared myotis	<i>Myotis evotis</i>
fringed myotis	<i>Myotis thysanodes</i>
California myotis	<i>Myotis californicus</i>
big brown bat	<i>Eptesicus fuscus</i>
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>
brush rabbit	<i>Sylvilagus bachmani</i>
snowshoe hare	<i>Lepus americanus</i>
whitetailed hare	<i>Lepus townsendii</i>
black-tailed hare	<i>Lepus californicus</i>
California kangaroo rat	<i>Dipodomys californicus</i>
creeping vole	<i>Microtus oregoni</i>
porcupine	<i>Erethizon dorsatum</i>
coyote	<i>Canis latrans</i>
red fox	<i>Vulpes vulpes</i>
** black bear	<i>Ursus americanus</i>
ermine	<i>Mustela erminea</i>
striped skunk	<i>Mephitis mephitis</i>
mountain lion	<i>Felis concolor</i>
bobcat	<i>Felis rufus</i>
** elk	<i>Cervus elaphus</i>
** mule deer	<i>Odocoileus hemionus</i>
Western pond turtle	<i>Clemmys marmorata</i>
Western fence lizard	<i>Sceloporus occidentalis</i>
Northern alligator lizard	<i>Gerrhonotus coeruleus</i>
ringneck snake	<i>Diadophis punctatus</i>

Gross and meadows specifically (Species associated with WHR types PGS, AGS, WTM: Meadows, grasslands, seral stage 1)**

Common Name	Scientific Name
Canada goose	<i>Branta canadensis</i>
Northern harrier	<i>Circus cyaneus</i>
red-tailed hawk	<i>Buteo jamaicensis</i>
ferruginous hawk	<i>Buteo regalis</i>
rough-legged hawk	<i>Buteo lagopus</i>
American kestrel	<i>Falco sparverius</i>
prairie falcon	<i>Falco mexicanus</i>
killdeer	<i>Charadrius vociferus</i>
common snipe	<i>Gallinago gallinago</i>
rock dove	<i>Columba livia</i>
mourning dove	<i>Zenaidura macroura</i>
common barn owl	<i>Tyto alba</i>
Western kingbird	<i>Tyrannus verticalis</i>
horned lark	<i>Eremophila alpestris</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
bank swallow	<i>Hirundo rustica</i>
American robin	<i>Turdus migratorius</i>
water pipit	<i>Anthus spinoletta</i>
European starling	<i>Sturnus vulgaris</i>
lark sparrow	<i>Chondestes grammacus</i>
savannah sparrow	<i>Passerculus sandwichensis</i>
grasshopper sparrow	<i>Ammodramus saviannarum</i>
Western meadowlark	<i>Sturnella neglecta</i>
Cassin's finch	<i>Carpodacus cassinii</i>
coast mole	<i>Scapanus orarius</i>
broad-footed mole	<i>Scapanus lahmanus</i>
Belding's ground squirrel	<i>Spermophilus beldingi</i>
California ground squirrel	<i>Spermophilus beecheyi</i>
Botta's pocket gopher	<i>Thomomys bottae</i>
Western pocket gopher	<i>Thomomys mazama</i>
mountain pocket gopher	<i>Thomomys monticola</i>
** Western harvest mouse	<i>Reithrodontomys megalotis</i>
montane vole	<i>Microtus montanus</i>
** California vole	<i>Microtus californicus</i>
long-tailed vole	<i>Microtus longicaudus</i>
house mouse	<i>Mus musculus</i>
badger	<i>Taxidea taxus</i>
short-horned lizard	<i>Phrynosoma douglassi</i>
Western skink	<i>Eumeces skiltonianus</i>
racer	<i>Coluber constrictor</i>
gopher snake	<i>Pituophis melanoleucus</i>

Appendix G - Fish, Wildlife, & Botany Habitat Management

Shrubs - early seral stages (All forested habitat types Openings, seral stages 2 and 3a)**

Common Name	Scientific Name
Anna's hummingbird	<i>Calypte anna</i>
dusky flycatcher	<i>Empidonax oberholseri</i>
ash-throated flycatcher	<i>Myiarchus cinerascens</i>
bush-tit	<i>Psaltriparus minimus</i>
Bewick's wren	<i>Thryomanes bewickii</i>
ruby-crowned kinglet	<i>Regulus calendula</i>
blue-gray gnatcatcher	<i>Polioptila caerulea</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
cedar waxwing	<i>Bombus cedrorum</i>
phainopepla	<i>Phainopepla nitens</i>
orange-crowned warbler	<i>Vermivora celata</i>
Nashville warbler	<i>Vermivora ruficapilla</i>
yellow-rumped warbler	<i>Dendroica coronata</i>
black-throated gray warbler	<i>Dendroica nigrescens</i>
Western tanager	<i>Piranga ludoviciana</i>
lazuli bunting	<i>Passerina amoena</i>
rufous-sided towhee	<i>Pipilo erythrophthalmus</i>
fox sparrow	<i>Passerella iliaca</i>
white-crowned sparrow	<i>Zonotrichia leucophrys</i>
purple finch	<i>Carpodacus purpureus</i>
yellow-pine chipmunk	<i>Tamias amoenus</i>
Allen's chipmunk	<i>Tamias senex</i>
golden-mantled ground squirrel	<i>Spermophilus lateralis</i>
dusky-footed woodrat	<i>Neotoma fuscipes</i>
heather vole	<i>Phenacomys intermedius</i>
ringtail	<i>Bassariscus astutus</i>
Western spotted skunk	<i>Spilogale gracilis</i>
Western whiptail	<i>Cnemidophorus tigris</i>
Southern alligator lizard	<i>Gerrhonotus multicarinatus</i>

Late seral forests (All forested habitat types late seral stages 4a, 4b, 4c and Multi-layered)

Common Name	scientific Name
Del Norte salamander	<i>Plethodon elongatus</i>
great blue heron	<i>Ardea herodias</i>
**Northern goshawk	<i>Accipiter gentilis</i>
blue grouse	<i>Dendragapus obscurus</i>
**Northern spotted owl	<i>Strix occidentalis</i>
hairy woodpecker	<i>Picoides villosus</i>
white-headed woodpecker	<i>Picoides albolarvatus</i>
black-backed woodpecker	<i>Picoides arcticus</i>
**pileated woodpecker	<i>Dryocopus pileatus</i>
olive-sided flycatcher	<i>Contopus borealis</i>
Hammond's flycatcher	<i>Empidonax hammondi</i>
gray jay	<i>Perisoreus canadensis</i>
Steller's jay	<i>Cyanocitta stelleri</i>
mountain chickadee	<i>Parus gambeli</i>