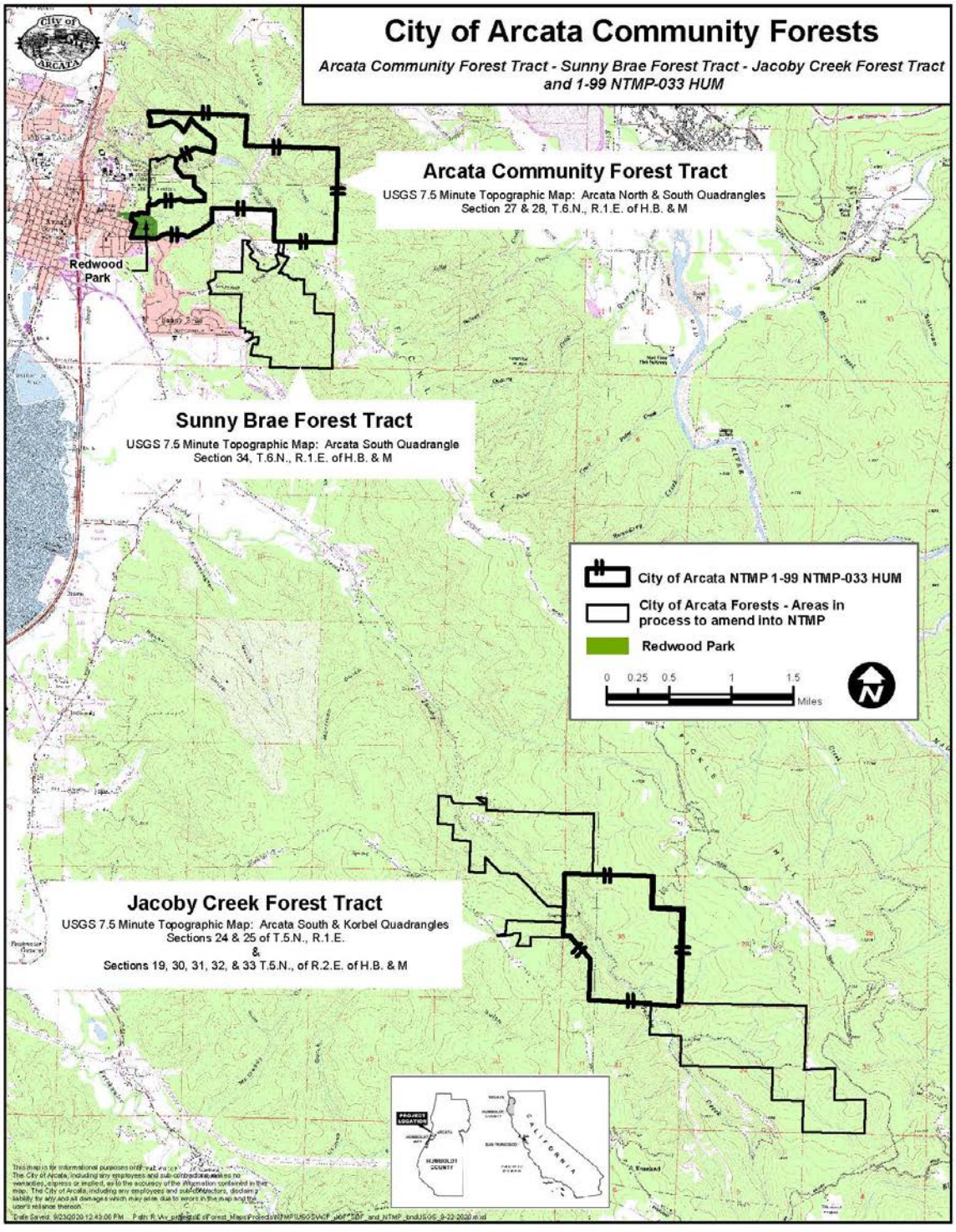
Arcata Community Forest Management Plan Update 2020

This draft updated and amended Forest Management Plan is intended to set the goals and to guide the development of programs and management on the Arcata Community Forest (ACF).

December 30, 2020 draft


City of Arcata Community Forests
Arcata Community Forest Tract - Sunny Brae Forest Tract - Jacoby Creek Forest Tract and 1-99 NTMP-033 HUM
Arcata Community Forest Tract
USGS 7.5 Minute Topographic Map: Arcata North & South Quadrangles
Section 27 & 28, T.6.N., R.1.E. of H.B. & M
Redwood Park
Sunny Brae Forest Tract
USGS 7.5 Minute Topographic Map: Arcata South Quadrangle
Section 34, T.6.N., R.1.E. of H.B. & M
City of Arcata NTMP 1-99 NTMP-033 HUM
City of Arcata Forests - Areas in process to amend into NTMP
Redwood Park
0 0.25 0.5 1 1.5
Miles
Jacoby Creek Forest Tract
USGS 7.5 Minute Topographic Map: Arcata South & Korbel Quadrangles
Sections 24 & 25 of T.5.N., R.1.E.
&
Sections 19, 30, 31, 32, & 33 T.5.N., of R.2.E. of H.B. & M
PROJECT LOCATION
HUMBOLDT COUNTY
CALIFORNIA

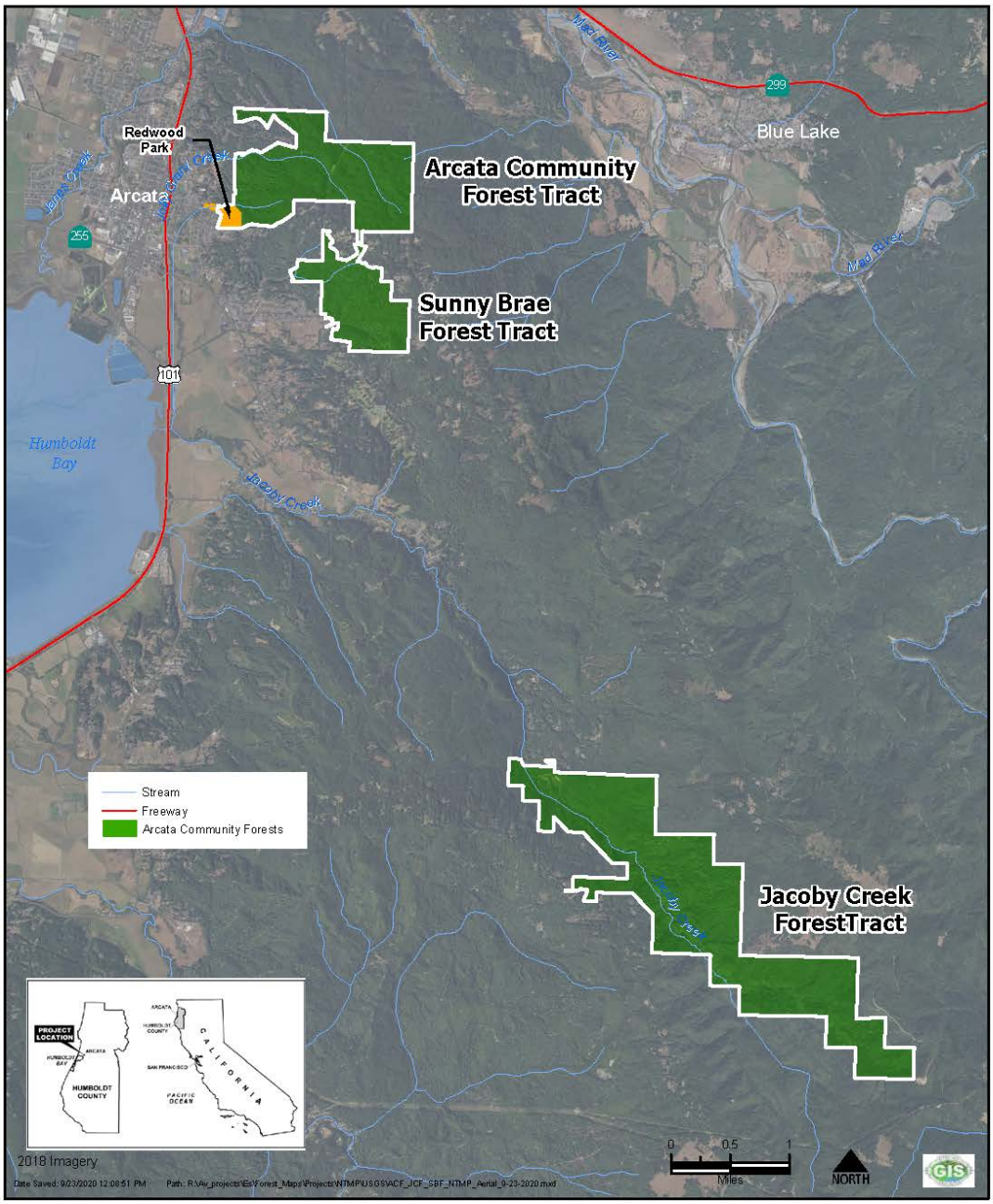


FIGURE 8.1 Arcata Community Forest

ABBREVIATIONS AND ACRONYMS

ACF	Arcata Community Forest
BMP	Best Management Practices
CCR	California Code of Regulations
CAL FIRE	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
FMAC	Arcata Forest Management Advisory Committee
CFI	Continuous Forest Inventory
CFIP	California Forest Improvement Program
CE	Conservation Easement
CMAI	Culmination of Mean Annual Increment
CNDD	California Natural Diversity Database
CEQA	California Environmental Quality Act
DBH	Diameter at Breast Height
FMP	Forest Management Plan
FSC	Forest Stewardship Council
GIS	Geographic Information Systems
HSU	Humboldt State University
JCF	Jacoby Creek Forest
LSA	Larry Seaman & Associates
MBF	Thousand Board Feet
MMBF	Million Board Feet
NTMP	Non-Industrial Timber Management Plan
PG&E	Pacific Gas and Electric Company
PRC	Public Resources Code
RPF	Registered Professional Forester
THP	Timber Harvest Plan
SBF	Sunnybrae Forest
TPZ	Timber Production Zone
TSI	Timber Stand Improvement
WFMP	Working Forest Management Plan
CWHR	CA Wildlife Habitat Relationships
WLPZ	Watercourse and Lake Protection Zone

USFWS	United States Fish and Wildlife Service
USGS	United States Geological Service

PREFACE

The purpose of this project is to develop an updated forest management plan to direct management of the Arcata Community Forest the next 10 - 15 year period. It serves as a guide to forest managers as well as a public disclosure of the management direction at ACF. It refers to, and should be interpreted in context with, the 2000 General Plan, Park and Recreation Master Plan, Open Space Master Plan, Bike and Pedestrian Master Plan and the Arcata Municipal Code. Although the goals and objectives are quite similar to the Arcata Community Forest/Jacoby Creek Forest Management Plan of 1994, there are significant changes including:

1. Expansion of the forest area
2. Addition of public access management adjacent conservation easements.
3. Changes in land base allocations
4. Refined techniques and methodology
5. Amendments to standards and guidelines

The goal of this plan is to provide a management flexible and adaptive program that provides for protection and use of forest resources; address local and regional issues and concerns; and fulfills legislative requirements. The updated plan is fundamentally designed to restore and move a relatively even-aged forest to a more structurally complex forest. The ultimate goal is to develop late-seral or old-growth forest characteristics. Tangible outcomes of management include:

- Fostering and accelerating the transition to an old forest stand structure through selective thinning that promote light in the forest understory and stimulate recruitment of new tree age class
- Obtaining support from the community for management that includes timber harvests in close proximity to residential areas and recreational use areas
- Protecting and enhancing biological diversity and rare species, including maintenance of northern spotted owl (*Strix occidentalis caurina*) nesting pairs
- Contributing to the local economy by providing a source of wood products and jobs in the woods
- Providing an opportunity for residents to be involved in forest planning, as well as on-the-ground activities, with volunteer work days that amount to at least 5,000 volunteer hours per year
- Providing opportunities for non-motorized recreation and contributing to the local tourism economy
- Testing different silvicultural practices and “no-cut” watercourse protection zones to protect and enhance water quality, as well as providing a network of connectivity of older seral forest habitat for species that require those conditions.
- Maintaining a climate resilient landscape within the city forestlands.

The Forest Management Plan provides direction and guidance for the managed uses of forest resources and non-timber resources with an emphasis on fish and wildlife habitat, recreation, watershed protection, demonstration and education, research and timber management. Timber harvesting is one of the mechanisms used to implement forest management, protect public trust resources and generate revenue. Other mechanisms include reforestation, road rehabilitation, watershed restoration, fuels reduction, and other methods. All management activities conducted on ACF under the guidance of the project are subject to further CEQA analysis at the project level. Much of this will occur under the Non-Industrial Timber Management Plan (NTMP), which has been reviewed under CAL FIRE’s functional equivalent process (PRC § 21080.5). The plan developed for the Community Forest is consistent with the state of California Forest Practice Regulations that govern timber harvest on private lands under Title 14, California Code of Regulations. These regulations are used to implement the Forest Practice Act. They dictate minimum stocking levels and actions that govern the conduct of timber operations in the field. These regulations also determine that, for an entity the size of Arcata, the appropriate regulatory management plan for timber harvest and forest planning activities is a nonindustrial timber management plan. This type of plan is the formal environmental review document that must be prepared by a registered professional

forester and approved by the California Department of Forestry and Fire Protection State and Federal Policies. Further applicable regulations include the California Timberland Productivity Act of 1982 (Gov. C. 51100 et seq.), the intent of which is to "encourage investment in timberlands based on reasonable expectation of harvest," and to "discourage premature or unnecessary conversion of timberland to urban and other uses." Other applicable regulations that govern activities within the forest relative to habitat and watercourse protection include the Porter-Cologne Water Quality Control Act (California Water Code, Division 7), the federal 1972 Clean Water Act, the California Endangered Species Act (Fish & G.C. 2050 et seq.), and the federal Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884). Amendments to add acres to the NTMP or other amendments will also fall under the Forest Practice Rules. Other projects will be evaluated on a case-by-case basis as to the proper CEQA analysis. In any case, site-specific CEQA analysis, including imposition of mitigation to ensure a less-than-significant effect, will occur prior to on-the-ground implementation of specific management actions outlined in the FMP. An Initial Study and Negative Declaration has been prepared for this management plan

The Arcata Community Forest is a significant community asset. It is the responsibility for the current generation to convey this asset and pass it on to future generations as a healthy ecosystem. This makes it essential for citizens to understand what a healthy ecosystem is and why it is important. The role of local government as managers of such a community asset is to foster reciprocal relationships between forest and people.

The plan was developed by the City of Arcata Environmental Services Department. Contributors to the effort include the following:

Arcata Forest Management Committee
Dennis Halligan - Chair
Michael Furniss
Danny Hagans
Russ Forsburg
Jack Naylor
Yana Valachovic
Ken Hoffman

City Staff
Mark Andre – Environmental Services Director, Registered Professional Forester #2391
Brian Kang, GIS Specialist - Maps/GIS and Graphics
Michael McDowall, Natural Resources Technician- Wildlife/Botanical/Forest Inventory
Emily Benvie, Environmental Programs Manager- Environmental Analysis and CEQA
Danielle Allred & Bella Waters, Administrative Assistants - Editing/Layout

This Forest Management Plan was developed for the City of Arcata with input from the citizens of Arcata and numerous stakeholders. For more detailed information concerning management of Arcata's publically owned forests, contact:

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This Forest Management Plan was written by predominantly white natural resources professionals and municipal officials and employees who reside on the unceded ancestral territory and current homeland of the Wiyot people.

Arcata Community Forest Mission Statement

- ❖ Biological and physical elements of the forests, specifically wildlife, aquatic, and plant species, plant and animal communities, and watershed processes are maintained;
- ❖ Forest stewardship, including timber harvest, maintains forest integrity while generating public benefits;
- ❖ Forest stewardship is fully supported by the community;
- ❖ Community and visitors enjoy the forest setting and recreate in a respectful manner;
- ❖ Public land ownership extends to include watersheds and headwater areas as well as corridors to neighboring communities;
- ❖ Forest serves as an outdoor laboratory for local schools and the university where research and other academic studies are fostered; and
- ❖ The City's forests continue to serve as a model, nationally and internationally, of managed redwood forests while striving for resource protection, revenue generation, and opportunities for public enjoyment.

.ORGANIZATION OF THE MANAGEMENT PLAN

The Forest Management Plan is organized into the following headers:

CHAPTER 1 INTRODUCTION

Describes the purpose of the plan relates the Forest Plan to other plans and describes the history.

CHAPTER 2 SUMMARY OF THE MANAGEMENT SITUATION

Reviews current management by resource and addresses the emphasis for future management.

CHAPTER 3 MANAGEMENT DIRECTION

Documents bow the forests will be managed; addresses policies; defines goals and objectives; outlines standards and guidelines; and explains rationale why areas are managed for specific reasons.

CHAPTER 4 MONITORING AND EVALUATION

Assesses the success of the Plan implementation and determines if it should be amended or revised.

CHAPTER 5 GLOSSARY AND REFERENCES

List of literature cited or consulted as well as terms and used in this document.

CHAPTER 6 APPENDIXES

Provides extensive data, maps and other information to support other elements of the management plan.

CHAPTER 1

INTRODUCTION

This chapter describes the purpose of this management plan, its legislative basis and relationship to other management plans. The implementation of this plan and manner of amendment of the plan are also in this chapter. A brief review of the history of the management of these forests is included. And finally, the administrative structure and policy is described.

PURPOSE

The City of Arcata owns three separate tracts of forestland that comprise approximately 2,445 acres. The publicly owned Arcata Community Forest that includes the Jacoby Creek Unit, Sunny Brae Unit and the Arcata Forest Unit constitute a significant ecological, recreational, economic and educational resource to the citizens of Arcata and the surrounding region.

The purpose of the management plan is to provide guidance for integrated multi-resource management activities, and establish standards and guidelines for the Arcata Community Forest. Purposes of the Plan are to:

1. Describe resource management practices.
2. Establish monitoring and evaluation requirements to ensure that management objectives are met.
3. Provide resource inventory data.
4. Guide the management of the forest forests for the next 10-15 years, and includes long-range goals and objectives.

The plan is intended to identify long-term overall desired conditions and provide general direction for achieving those desired conditions. The plan allows some management flexibility to adapt to local conditions for particular projects that implement the plan.

An **objective** is a measurable, and time-specific statement of a desired rate of progress toward a desired condition or conditions. Objectives are based on reasonable foreseeable budgets.

A **goal** is a broad statement of intent, other than desired conditions, usually related to process or interaction with the public. Goals are expressed in broad, general terms, but do not include completion dates. Goals may be used to describe overall desired conditions of the Community Forest plan area that may also be dependent on conditions beyond the city's forest boundary.

LEGISLATIVE BASIS

Under the provisions of the 1979 "Forest Management and Parkland Initiative", the City Council authorized the development of a forest management plan and program to provide revenues to be used for parkland acquisition, development and maintenance (Resolution No. 801-12). Specifically, Section III. Item (1.) of the initiative states:

"The City Council shall develop a forest management and use plan for the City-owned Jacoby Creek and Community Forests which will provide for utilization of the resources in accordance with the principles of ecological forestry and perpetual sustained yield. The following elements shall be incorporated into the Management Plan: (a) Reforestation and revegetation, (b) Fish and Wildlife Protection and Rehabilitation of Streams, (c) Timber harvesting, (d) Soils and erosion prevention, (e) Watershed protection and rehabilitation, and (l) recreation, access and circulation.

The goals of this plan shall be to protect the long-term productivity and quality of the land for both consumptive and non-consumptive uses". The plan is also consistent with the Arcata Municipal Code.

RELATIONSHIPS TO OTHER PLANS

This Forest Management plan will replaced the 1994 Arcata Community Forest/Jacoby Creek Forest FMP by incorporating, updating and revising much of that Plan into this document. The Plan is also related to and falls under the policies contained within the 2000 City of Arcata General Plan (2000) and is designed to integrate with the 1991 Arcata Creeks Management Plan, 2011 Parks and Recreation Master, and Open Space Master Plan, 2009 Greenhouse Gas Reduction Plan and 2010 Bike and Pedestrian Master Plan.

The 2020 management plan update reflects updated information, recent research and State Forest Practice Rule changes, thus providing management direction with a higher degree of environmental protection. The overall goals as stated in the 1979 Initiative and 1994 FMP still applies to the updated plan.

The Plan and its appendices will serve as an umbrella document for future planning and management of the City Forests.

The plan developed for the Community Forest is consistent with the state of California Forest Practice Regulations that govern timber harvest on private lands under Title 14, California Code of Regulations. These regulations are used to implement the Forest Practice Act. They dictate minimum stocking levels and actions that govern the conduct of timber operations in the field. These regulations also determine that, for an entity the size of Arcata, the appropriate regulatory management plan for timber harvest and forest planning activities is a nonindustrial timber management plan. This type of plan is the formal environmental review document that must be prepared by a registered professional forester and approved by the California Department of Forestry and Fire Protection State and Federal Policies. Further applicable regulations include the California Timberland Productivity Act of 1982 (Gov. C. 51100 et seq.), the intent of which is to “encourage investment in timberlands based on reasonable expectation of harvest,” and to “discourage premature or unnecessary conversion of timberland to urban and other uses.” Other applicable regulations that govern activities within the forest relative to habitat and watercourse protection include the Porter-Cologne Water Quality Control Act (California Water Code, Division 7), the federal 1972 Clean Water Act, the California Endangered Species Act (Fish & G.C. 2050 et seq.), and the federal Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884).

Individual projects, will require detailed environmental analysis before implementation. These plans will operate under the policies, objectives and standards set forth within the Forest Management Plan. The City has been was issued a Non -Industrial Timber Management Plan (NTMP 1-99-NTMP033 HUM) in 1999. The NTMP is a long-term management option and permit available to timber land ownerships of less than 2,500 acres. Plan amendments and deviations are sent to CAL FIRE as lead agency for review and approval. Elements of the NTMP include:

- A description of timber stand characteristics,
- A description of proposed activities within each management unit,
- A description of cultural or historical records, and
- Information on threatened or endangered plant or animal species.

The NTMP format stipulates that the landowner must practice uneven age management and demonstrate and document sustainable harvesting. The City also is committed to management under the Forest Stewardship Council (FSC) principles and standards.

IMPLEMENTATION

The implementation of the plan will continue to be carried out by City staff under the Environmental Services Department. Policies and procedure for projects will continue to be decided and evaluated by the Arcata Forest Management Committee. This committee is advisory to the City Council and is defined in the Arcata Municipal Code section 2254.

AMENDMENTS AND REVISIONS

This plan will ordinarily be revised or amended every ten to twenty years unless the demands of the public, monitoring results or other forest conditions warrant revision at an earlier date. Any revision will incorporate public involvement in the process. The City Council will take final action on all revision or major amendments.

ADDITIONAL SOURCES OF INFORMATION

The plan is a public document. It is intended to explain forest planning, management and ecological processes in terms that are understandable. It is difficult, however, to describe natural resource management without the use of specialized terminology. Consult Chapter 5 Glossary and References for definitions of terms discussed in this document.

FOREST DESCRIPTION

The Arcata Community Forest (ACF) Tract is a 704 acre tract located within the City limits and on the east side of town. The western boundary of the forest forms a distinct urban/forest interface and is an integral part of the town's atmosphere. Connected to the ACF Tract on the south side of Fickle Hill Road is 330 acre ACF Sunny Brae Unit. The City also manages recreational use on a 185 acre private parcel adjacent to the ACF on the north where the City holds a conservation easement. This parcel is known as the “Samuels” tract and host the N. Fork Janes loop Trail (3- miles) and a segment of the Arcata Ridge Trail. The 1,389 acre Jacoby Creek Forest Tract is located in the middle portion of the Jacoby Creek watershed approximately five miles from the coast. Although isolated from the rest of the City, it is within City limits. It is surrounded by commercial timberland or smaller rural ownerships in the unincorporated county area. Recreational and educational access is provided to the Jacoby Creek Forest by permits issued by the City.

HISTORY 1800-1979

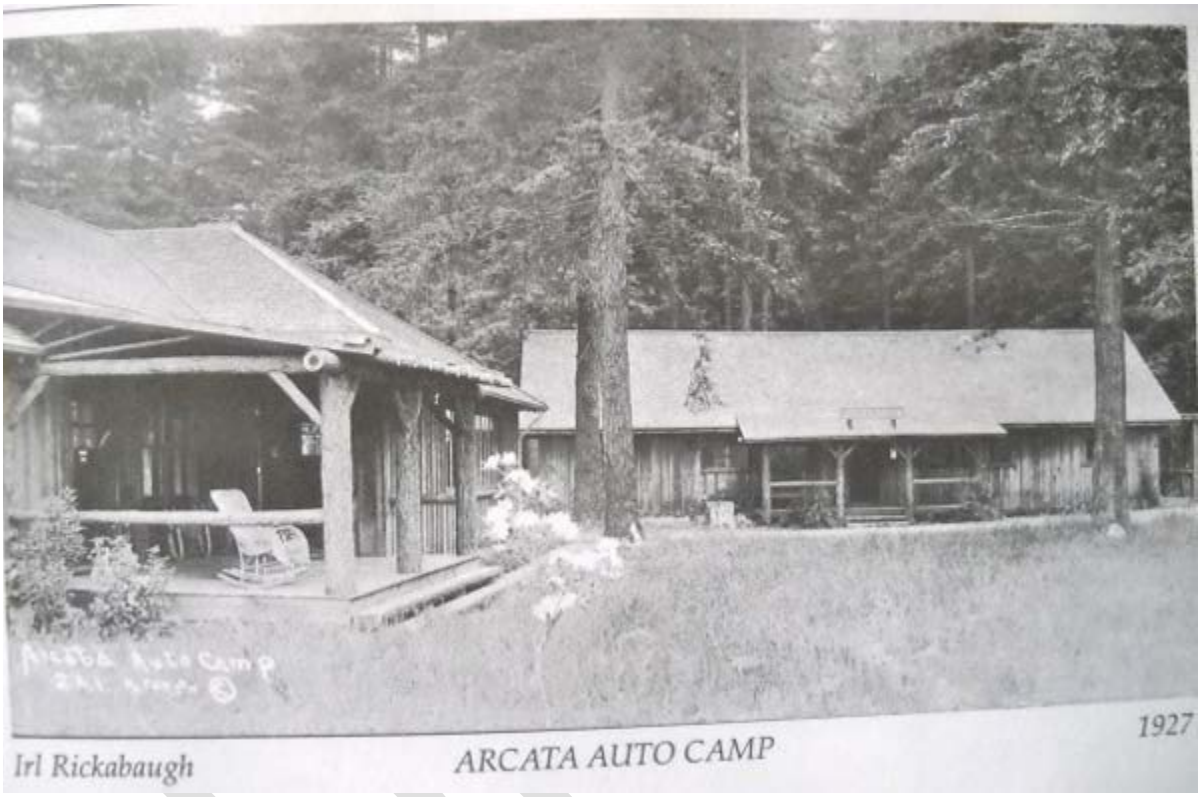
Prior to the arrival of Euroamericans, the Wiyot people inhabited the area. Native people lived in villages adjacent to the forests which they frequented for hunting, and fishing and other uses. The Wiyot population prior to 1850 is estimated to have been between 1,000 and 3,300 individuals (Roscoe, et. Al., 2010).

Soon after the Euroamericans began to occupy the ancestral homeland of the Wyiot, a round 1850, the Wyiot population was decimated by violence and disease. In 1850, Arcata or "Uniontown" was started as a supply depot for the gold fields near Weaverville and the Native tribes were soon driven off their lands. The Wyiot Tribe today is 600 members strong and growing.

Lands within the Community Forest were claimed through land patents. Most of the original Community Forest was logged during the 1880's. Trees were felled with axes, wedges and crosscut saws. Large trees with defects and many smaller diameter trees were left following logging although they were usually consumed in the slash fires which regularly occurred. No attempt was made to replant.

Oxen teams were used to skid massive redwood logs to Humboldt Bay. Signs of early logging can still be found on old growth stumps and within watercourses in the lower Community Forest. Most of the older conifers trees that

remain today were naturally regenerated from the stumps and seeds of the original first growth forest. Following the old growth logging era, the Community Forest was used for grazing and for water supply. It was not until the 1930-1940's that the citizens of Arcata gained title to the Community Forest property for the purpose of providing water supplies to the town. (Van Kirk 1985). The Union Water Company collected and conveyed water from the Community Forest to Arcata's residents until 1963 when the Raney wells were constructed on the Mad River to supply Arcata with municipal water.



Auto Campground in Redwood Park 1927.

The original 535 acre Jacoby Creek Forest, located several miles from downtown Arcata, was purchased in 1942 from L.N. Lentell for $18,000. This forest tract, which had been logged in 1913 with steam donkeys, was also acquired for municipal water supply but was never developed for that purpose. A private road was constructed during the early 1960's up the Jacoby Creek canyon to access timber on lands upstream from the city owned parcel. During this period, much of the Jacoby Creek watershed was logged and the logs hauled down the road through the Jacoby Creek Forest road easement. This road fell into disrepair and has recently been removed to prevent further erosion into Jacoby Creek.

The Community Forest was dedicated in 1955 as the first municipally owned forest in the State of California, and was to be "managed for the benefit of all the citizens of the city, with attention to watershed, recreation, timber management and other values" (Humboldt Times, May 15, 1955). During the period of 1965- 1971 most of the Community Forest was commercially thinned with revenues used for infrastructure and city services. A road system was designed and construction began in 1962. During this period, a total of 16.7 million board feet (MBF) of saw timber was cut from the Community Forest. At that time, second-growth redwood was not a desired species and they were left in favor of Douglas-fir, grand fir, and Sitka spruce. The result of that logging episode

was to create a simplified system of homogenous even-aged redwood stands. Forestry faculty from Humboldt State University prepared harvest and road plans and supervised operations with direction from a three member Forest Advisory Commission. Most of the records and mensurational data collected during this period were lost when the Forestry Building at Humboldt State was damaged by fire on January 29, 1979.

HISTORY OF ACTIVITIES 1980-2020

Following voter approval of the Forest Management and Parkland Bond initiative of 1979, the Arcata Community Forest/Jacoby Creek Multiple-Use Management Plan was adopted and, subsequently, the plan was updated in 1994. This plan set guidelines for managing the forests in accordance with "principles of ecological forestry and perpetual sustained-yield". Revenue from timber harvest activities were used to pay for forest management activities and to pay parkland acquisition bonds. The Parkland Bond that funded the acquisition of several city parks was paid during a period of low timber markets and a decision to pay off the 20-year bond nine years early was made to minimize interest payments.

During this period of time the City also experimented with methods of variable retention and green tree retention geared towards the retention of structural features found in older forests and imitation of natural disturbances. Approximately 26 million board feet have been harvested between 1981 and 2020. From 2003 to 2020, the City added 1,371 acres to the forest in several acquisitions ranging from 2-acres to 325 acres. A acquisitions were made on a “willing seller” basis at fair market value. . Most of the recent acquisitions were funded state, federal and foundation grants leveraged with a portion of timber harvest revenue. Arcata citizens demonstrated support for forest expansion by making donations. Primary grant funders include the CA Wildlife Conservation Board, CAL FIRE, CA Natural Resources Agency, CA Department of Fish and Wildlife, USDA, CA State Parks, Save the Redwoods League and the Humboldt Area Foundation. Most of the recent acquisitions contain constraints that provide for future forest management direction consistent with city policies.
Recorded deed restrictions such as conservation easements held by others, notices of recorded grant agreements and, baseline conditions reports are on file at the City Environmental Services Department. The acquisitions all had strategic importance to the city that included:

1. Improved management and public access.
2. Buffering of the existing ACF from potential urban encroachment or incompatible adjacent uses.
3. Protection of fish and wildlife habitat.
4. Securing lands with ecological value and connectivity to other protected lands.
5. Expand opportunities for forest based revenue generation.
6. Expansion of opportunities for research and education.

The additional Community Forest fee title lands include:

- 2001- JCF Tract- 325 acres from the Lucchesi Family
- 2003- JCF Tract -285 acres from the Barnum Timber Company
- 2006- SBF Tract- 175 acres from RH Emmerson
- 2008-JCF Tract- 121 acres from FKS Investment Company
- 2010- SBF Tract- 25 acres from Edith Stromberg
- 2011- SBF Tract-114 acres from Robert Morris
- 2012- SBF Tract -22 acres from the Schmidbauer Family Trust
- 2013- ACF tract -2.5 acres from Theodore and Lucinda Humphry
- 2016 ACF Tract- 2 acres from Cynthia Forsyth
- 2016 JCF Tract- 40 acres donated from Cherry Kline-Laforge
- 2018-ACF Tract-20 acres from John and Claudia Lima

- 2019 ACF Tract- 49 acres from Cynthia Forsyth
- 2019 JCF Tract -83 acres from RH Emmerson
- 2020 JCF Tract-114 acres from the Swaner Family Trust

*All past and future acquisitions for the ACF comply with CEQA and subdivision, developmental or residential uses are no longer a permitted use on the acquired lands.

In 2012, the City registered three (3) forest carbon projects with the Climate Reserve on 785 acres of the newer lands added. The Project numbers are CAR575; CAR694 and CAR935. To date approximately 100,000 metric tonnes or Climate Reserve Tonnes (CRT's) have been issued from the city forest carbon projects. During the past 10 years, three conservation easements (CE) have been donated to the City ranging from 1 acre to 185 acres adjacent to the ACF. The 185 acre "Samuel's" Conservation easement allows the city to use the property for public access pursuant to the city forest rules and regulations. The Samuel's conservation easement also allows for a city log hauling to the north with an exit on West End Road.

PLANNING AND ADMINISTRATION

Policies and Procedures

The forest activity (87) is budgeted along with the overall City budget on an annual basis. Decisions on whether to harvest timber, purchase vehicles and equipment, acquire property etc. in a particular year lies with the City Council and is typically expressed in the budgetary process.

The public is invited to participate in the process and attend advisory committee meetings and council meetings where recommendations and decisions are made.

The membership of the Arcata Forest Management Committee has historically represented expertise in wildlife, forestry, watershed, fisheries and recreation. This body functions as a multi-disciplinary team in reviewing any timber harvest plans or activities that have potential to impact forest resources. The committee and council conduct a study session once per year to discuss policy issues pertaining to forest management. The committee also schedules a field trip with the public once per year.

Environmental Services Department

The Forest Management Activity is within the Environmental Services Department Natural Resources Division. The department is responsible for the implementation of the forest plan, budgeting and day to day management and operation of the forest.

Revenue

Timber harvest revenue is deposited into a special revenue account to be used for forest management purposes. The City received occasional grants from state and federal agencies and non-profits. A special *Arcata Forest Fund* has been established at the Humboldt Area Foundation and is described as follows:

"*The Arcata Forest Fund provides a source for private donations to assist the city of Arcata in purchasing forest lands to be added to the Arcata Community Forest, the Sunny Brae Forest, and the Jacoby Creek Forest. Donations to this fund will go only towards the purchase and restoration of forest lands, and it will help the city leverage state and federal grants. Forest lands purchased through these funds preserve and expand open space around the city, and they will be managed for recreation, watershed and habitat protection, carbon sequestration, and sustainable forestry use".*

Forest Data Maintenance and Storage

The City maintains detailed forest records including: timber stand data such as growth and stocking; wildlife data such as studies, reports, and maps. This data is available to the public and is maintained in the files of the Natural Resources Division of the Environmental Services Department. Geographically referenced data is retrievable on the Geographic Information System. Forest data is updated as needed unless otherwise stated in this management plan. The City's extensive GIS map library is available to the public and educational institutions.

Reference data on file, but not attached to this management plan include:

1. Forest and carbon inventory records;
2. Northern spotted owl survey records, and other wildlife survey records;
3. Stocking survey and reforestation records;
4. Monitoring reports;
5. Management unit work records;
6. Budgets;
7. Contracts and agreements;
8. Adjacent ownership list;
9. Forest Management Committee meeting minutes; and
10. Notices of Timber Operations and Erosion Control Plans.

PLANNING ENVIRONMENT AND METHODOLOGY

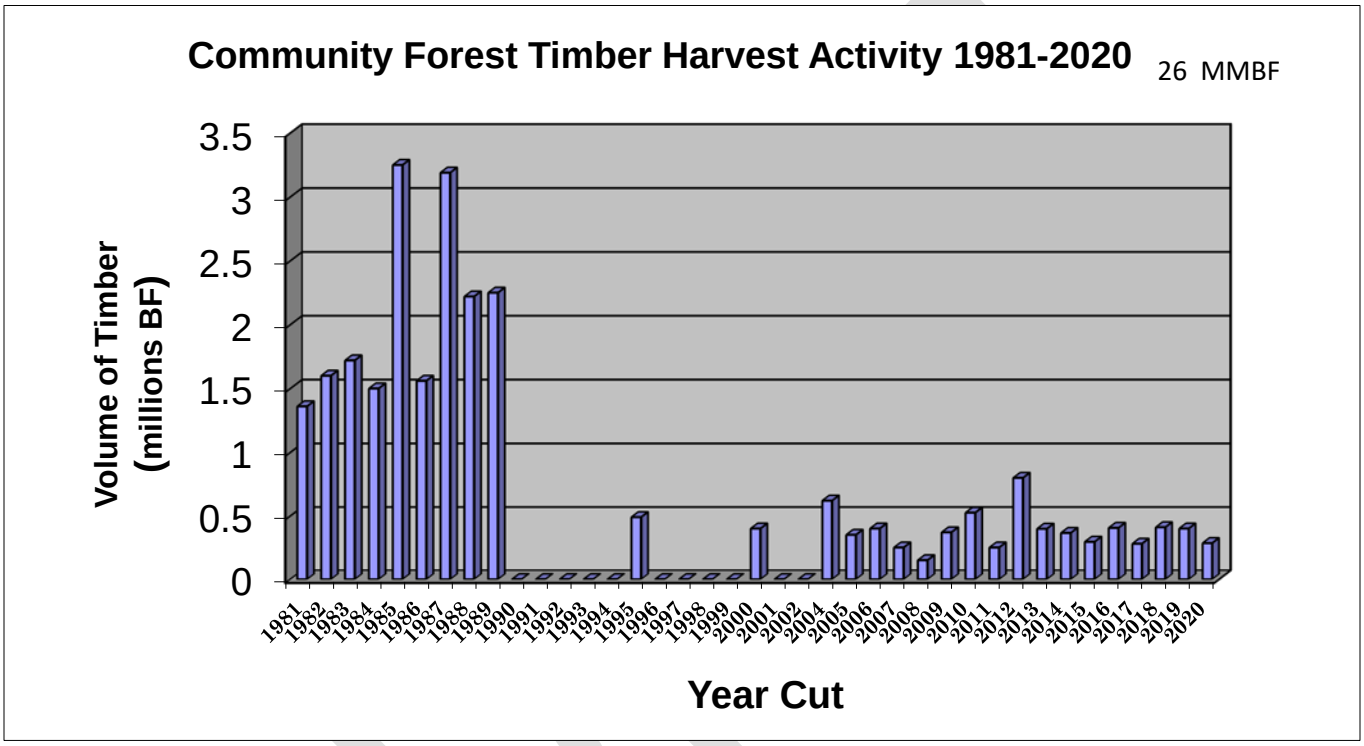
The current Forest Management Plan was developed by Environmental Services staff including the City RPF with technical guidance provided by the Arcata Forest Management Committee. The operation of the Community Forest is tied to the approved forest management plans and a 1979 voter-approved initiative to manage the forests using "ecological principles." Much of the City's parks and open space lands were purchased under the park bond funded by timber harvest revenues. The 1979 management plan was updated in 1994 and that effort was greatly influenced by the federal Northwest Forest Plan, which was also adopted in 1994. This plan called for an extensive system of late-successional and riparian reserves along with some timber harvest on the intervening lands under a set of controls and safeguards. The City's current Forest Management Plan (2019) is an updated version of the 1994 plan framework and includes additional lands acquired since that date.

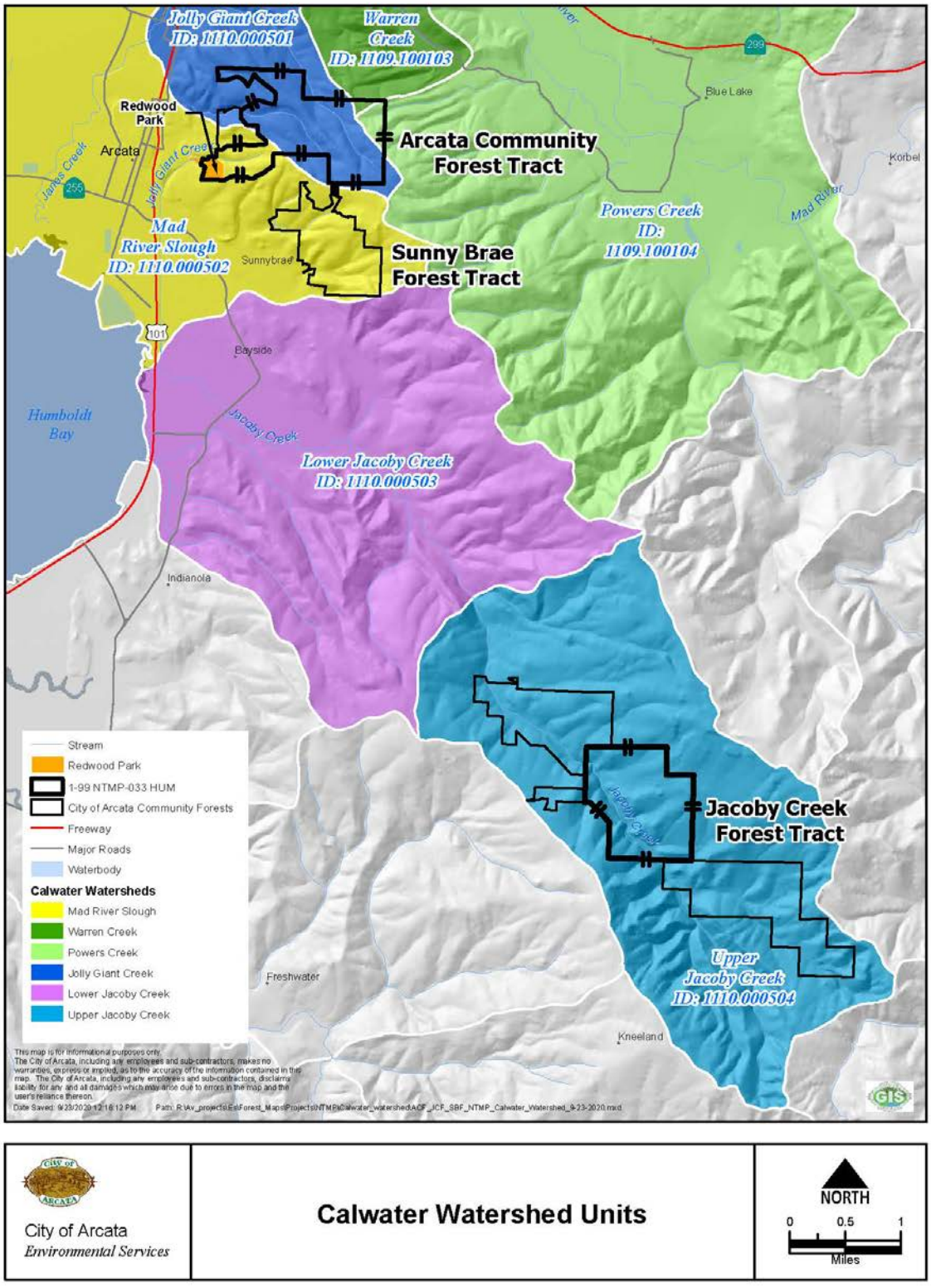
Currently, the Community Forest generates annual revenue of approximately $250,000–$400,000 U.S. dollars, which is typically more than is needed to be a self-supporting enterprise. Downturns in the timber market can make it a challenge to maintain a positive cash flow. Real property acquisitions (fee title and easements) typically exceed the forest fund ability to fund in total thus requiring other revenue sources such as grants to make feasible. Management costs have increased due to special status species surveys, increased recreational use and increased costs for labor and materials and logging costs. Excess net revenue when it is available, is used to purchase and maintain other city parklands and open space. Several parks and open space areas have been purchased with timber harvest revenue, including the City's main community park. The City or its timber purchaser's pays timber yield tax to the State Board of Equalization per PRC Section 4654 on timber harvested. The City typically requires that the log purchaser to pay this tax on the City's behalf. The City also pays property tax on some parcels that are located outside of the City limits (much of the Jacoby Creek Tract).

The forest is being managed to maximize habitat diversity, with an emphasis to move the forest toward old-growth conditions. Management priorities include watershed restoration, wildlife habitat, recreation, carbon sequestration, and timber harvest revenue. Approximately 25% of the land base is situated in reserves that are mostly riparian areas. The allowable annual harvest is approximately one-half of the annual growth increment therefore, the forests are accruing volume, structural complexity and age over time.

The City directs management to be tiered to three elements of community-based forestry: ecological, social, and

economic. The social component promotes engagement of all members of the community and builds local relationships of trust and reciprocity among diverse (and sometimes opposing) groups. It also enhances community knowledge and the skills necessary for planning and implementing sustainable forestry practices. The goal is not only more resilient forest ecosystems, but also more resilient communities, better equipped to respond to both challenges and opportunities. The ecological component involves the community in enhancing and restoring forested ecosystems, builds on local knowledge, and practices management and protection for the full range of social, ecological, and economic values. The economic strategy builds and sustains livelihoods based on natural resources. It often involves fostering small-scale, value-adding enterprises for timber. Economic benefits are often invested in the local community.





City of Arcata
Environmental Services

Calwater Watershed Units

NORTH
0 0.5 1
Miles

CHAPTER 2

SUMMARY OF THE MANAGEMENT SITUATION

This chapter summarizes forest resources and current management direction. It includes a description of the socio-economic context for management and a characterization of the forest resources. The management of these resources is treated in specific terms in Chapter 3.

Upper Jacoby Creek Tract

T*he Part of Good Citizens- A people without children would face a hopeless future; a country without trees is almost as helpless; forests which are so used that they cannot renew themselves will soon vanish, and with them all their benefits. When you help to preserve our forests or plant new ones you are acting the part of good citizens.*

--Theodore Roosevelt.

INTRODUCTION

The Arcata Community Forest consists of 2,445 acres of mostly second-growth redwood (*Sequoia sempervirens*) forest located near Humboldt Bay in north-coastal California. The City also owns more than 750 acres of wetland and riparian lowlands that are within the same small coastal watersheds. Other conifer species found on the forest include Douglas-fir (*Pseudotsuga menziesii)*, grand fir (*Abies grandis*), western hemlock (*Tsuga het- erophylla*), western red cedar (*Thuja plicata*), and Sitka spruce (*Picea sitchensis*). The forest is a recreational attraction for the region due its extensive trail system that supports hiking, mountain biking, and horseback riding. Arcata is home to Humboldt State University and its School of Natural Resources. For many of these young people, the years that they spend at the university are formative ones, as they achieve or expand their ecological awareness. The Arcata Community Forest facilitates opportunities for these students to connect with a small but perhaps influential forestry program.

The forest forms the headwaters for five salmonid streams that flow to Humboldt Bay via state, federal, and local wildlife areas. The quality of those areas is influenced by management activities in the Community Forest. Revenue from timber harvests has been used to purchase wetlands, creek-side conservation easements, and parkland that have benefited the Humboldt Bay Area ecosystem and recreational uses around Humboldt Bay.

Prior to public ownership of the forest, lands within the Arcata Community Forest were claimed through land patents in the 1860s. Land patents are the legal documents that transferred land ownership from the U.S. government to individuals. Most of the Community Forest was logged during the 1880s. Trees were felled with axes, wedges, and crosscut saws. Large trees with defects and many smaller diameter trees were left following logging although they were usually consumed in the slash fires, which regularly occurred. Oxen teams were once used to skid massive redwood logs to Humboldt Bay. Most of the trees that remain today were naturally regenerated from the stumps and seeds of the original first-growth forest. Following the logging of this area, the Community Forest was used for grazing and for water supply. It was not until the 1930–1940s that the citizens of Arcata gained title to the Community Forest property for the purpose of providing water supplies to the town (Van Kirk, 1985). The Union Water Company collected and conveyed water from the Community Forest to Arcata's residents until 1963, when the Ranney wells were constructed on the nearby Mad River. There are currently 32 recorded archaeological sites in the Arcata planning area. Most sites are situated along the margins of Humboldt Bay, along the edges of marshes and sloughs, and in the Arcata Bottom area. Sites also tend to be located at the base of hills and on mid-slope terraces near sources of water.
According to the Arcata General Plan, the most likely location for additional (unrecorded) archaeological sites is a band approximately 1,000 meters wide along the original Humboldt Bay 105 shoreline and the Mad River. There is also the possibility of encountering archaeological resources elsewhere in the Arcata planning area. (City of Arcata, 2008a).

The Community Forest was dedicated in 1955 as the first municipally owned forest in California, and was to be “managed for the benefit of all the citizens of the city, with attention to watershed, recreation, timber management and other values” (Humboldt Times, May 15, 1955). During the 1960s, much of the Community Forest was selectively logged. At that time, second-growth redwood was not a desired species and they were left in favor of Douglas-fir, grand fir, and Sitka spruce. The result of that logging episode was to create a simplified system of homogenous even-aged red- wood stands. Following voter approval of the Forest Management and Parkland Bond initiative of 1979, the Arcata Community Forest Multiple-Use Management Plan was adopted and subsequently the plan was updated in 1994 and again in 2013. The plan directed the City of Arcata to manage the forest using ecological principles, with a portion of the net revenue to be used for parkland acquisitions and development. The Community Forest was the first municipal forest certified in the United States under the Forest Stewardship Council (FSC).

The Arcata Community Forest is a significant community asset. It is the responsibility for the current generation to convey this asset and pass it on to future generations as a healthy ecosystem. This makes it essential for citizens to understand what a healthy ecosystem is and why it is important. The role of

local government as managers of such a community asset is to foster reciprocal relationships between forest and people.

The success of the ecosystem approach in managing Arcata's public forests depends on the community's interest and involvement as well as a degree of ecological awareness and understanding by the citizenry and elected officials. Arcata has been fortunate to have a high level of ecological knowledge and environmental ethics among its population, advisory committees and elected leaders. Future success will be measured in the ability to assist in the recovery of the forest structure and in the changes in composition and ecological processes that are necessary to more closely approximate reference conditions. Surrogate old-growth species such as the northern spotted owl, fisher (*Martes pennanti*), northern flying squirrel (*Glaucomys sabrinus*), and red tree vole (*Arborimus longicaudus*) are examples of indicators used in Arcata to demonstrate the positive trajectory in this regard.

The selective harvesting regime implemented over the past 39 years has visibly altered the forest. Larger trees that are more widely spaced and thus situated in a park-like condition, have more than anything else led to continued public support for the forest management program. By using a portion of the net timber revenue to leverage other funding sources, thus allowing the purchase of additional forestland and enabling the City to protect and restore urban streams and wetlands, tangible results of actively managing this public resource have been realized by the members of the public.

SOCIO-ECONOMIC SITUATION

This section provides a general overview of the social and economic factors that are relevant to City of Arcata Forest Management.

Sphere of Social Influence

The City of Arcata and the Humboldt Bay region comprise the primary zone of social influence for the Community Forests. The more remote Jacoby Creek Tract has little influence on population areas except as a far view shed, and several downstream rural residents derive domestic water supplies, in part, from water originating in the Jacoby Creek Tract. The City forests comprise 20.5 percent of the total City of Arcata incorporated area.

RESOURCE SITUATION

This section discusses the current direction of forest resource management and the management emphasis of plan.

Recreation and Interpretation

Current Direction

There are 19 miles of trails within the Community Forest (and adjacent conservation easement areas) that are heavily used by hikers, runners, bicyclists and equestrians. Recreational use of the Community Forest has steadily increased during the past twenty years. The City has encouraged recreational use through interpretive walks, maps and brochures and partnerships with recreational user groups. The ACF is a Forest Guild Model Forest and this status leads to frequent visits from out of the area foresters and allied disciplines. https://foreststewardsguild.org/model-forest-program/#MFRegion

The demand for recreation on the Community Forest is tied primarily to the population increase of Arcata and Humboldt State University, and it is also becoming a regional recreational asset. The Jacoby Creek Tract currently has recreational, cultural, scientific and educational use by permit only due to access restrictions on adjacent private land.

Management Plan Emphasis
The plan addresses the need to continue to resolve the increasing user conflicts, and resource degradation from recreational use. Potential easements and access routes are identified that would enhance the long-term recreational use of the Community Forest. The plan addresses the need for periodic surveys to ascertain levels of recreational use and user preferences. The Jacoby Creek Tract will only be used for recreational use if improved access can be secured and potential wildlife impacts can be rminimized. The Jacoby Creek Tract currently is open on a permit only basis for uses such as periodic docent led walks, education, research and monitoring.

Cultural and Historical Resources

Current Direction
Known historical resources in the Community Forest include logging camp debris, oxen skid trails and the old water system flume. Existing cultural resources are protected from management activities through exclusion of heavy equipment operation in the immediate vicinity. Lands that are proposed to add to the Community Forest require archeological surveys. Specific areas proposed to be harvested under a Notice of Timber Operations are surveyed during the during the operational layout process in order to detect any previously unknown sites or artifacts.

As part of the City' normal compliance process, and in accordance with the American Indian Religious Freedom Act (AIRFA) and the Antiquities Act, the State of California cultural records data base is consulted prior to implementation of any land disturbing activities. In addition, the Native American Heritage Council and local Native American tribes are consulted on timber harvest, road decommissioning and trail projects under the CEQA process.

All newly identified archaeological sites located within ACF will be appropriately documented soon after their discovery. Guidance for preparation of records is provided by the California Office of Historic Preservation (CDPR 1995). These records often include some combination of written description, site sketches, photographic records, and location maps as appropriate for the specific resource

Management Plan Emphasis
Continued assessments will be made to locate cultural resources before any significant activity in the forests. Personnel trained in archaeological inventory methods will inventory all sites before prior to timber harvest operations.

Timber Resources

Current Direction
Of the total 2,445 acre land base, approximately 25% is not currently available for timber management due to streamside protection areas, areas that cannot be reached, spotted owl activity centers, reserves or other current constraints. For the basis of the timber planning, 100 MMBF is the approximate current timber inventory for planning purposes with annual growth estimated to be 1.5M MMBF). Timber volume harvested between 1981- 2020 (39 years) was 26 MMBF.

For the next planning horizon annual timber harvest levels will be between 300 MBF-700 MBF which is less than annual growth. During the next ten year period some younger stands that have regenerated from early 1980's group selections and recently acquired lands that are younger age classes with relativity high number of trees per acres will be harvested using thinning or single-tree selection methods.

Uneven-age silvicultural systems have been applied during the past forty years and will continue to be applied during the next management cycle. Single-tree selection is the only method that has been used

since 2000. Broadcast burning has been minimized and manual conifer release has been used on the group selection areas.

Current timber management attempts to create structurally and compositionally diverse forest stands for the production of commodities and retention of ecological values. Emphasis is on long-term productivity, aesthetics and high quality forest products. Using tree spacing as a reference indicator, forests with tree densities of 120–200 trees per ac (297–494 trees per ha) would need to be slowly thinned over time to achieve a relative tree density of 20–35 trees per ac (49–86 trees per ha) as found on nearby old-growth stands. This could occur naturally through competition and mortality or be stimulated via mechanical thinning. Second-growth redwood has the ability to dramatically increase basal growth as a response to thinning. (Jameson et al., 2005).

The benefits of shifting from even-aged to uneven-aged forest conditions include larger and more vigorous trees, abundant understory vegetation, and proportionally greater redwood (*Sequoia sempervirens*) composition

Arcata General Plan polies include new development setbacks of at least 150' from the ACF boundary. Previous residential development that is close to the ACF boundary creates extra cost for the city for special treatment of slash within 100' of structures.

Plan Emphasis

The updated plan is fundamentally designed to restore and move a relatively even-aged forest to a more structurally complex forest. The ultimate goal is to develop late-seral or old-growth forest characteristics. Tangible outcomes of management include:

- Accelerating the transition to an old forest stand structure through selective thinning that promote light in the forest understory and stimulate recruitment of new tree age class;
- Obtaining support from the community for management that includes timber harvests in close proximity to residential areas and recreational use areas;
- Protecting and enhancing biological diversity and rare species, including maintenance of northern spotted owl (*Strix occidentalis caurina*) nesting pairs;
- Contributing to the local economy by providing a source of wood products and jobs in the woods;
- Providing an opportunity for residents to be involved in forest planning, as well as on-the-ground

activities, with volunteer work days that amount to 5,000 volunteer hours per year;
- Providing opportunities for non-motorized recreation and contributing to the local tourism economy; and
- Testing different silvicultural practices and “no-cut” watercourse protection zones to protect and enhance water quality, as well as providing a network of connectivity of older seral forest habitat for species that require those conditions.

The Reference Condition

A reference ecosystem is an actual or historically known ecosystem that is used in setting goals and planning a restoration project, and later in the evaluation of project success (Egan and Howell 2001; Gann and Lamb 2006). Fortunately, there are reference stands of old-growth redwood in the region that can serve as blueprints for the Arcata Community Forest. In fact, many of the missing ecological qualities can be found in nearby Redwood National Park and local state parks where recent research has documented redwood’s ability to increase wood production through old age (Sillet et al. 2010). Using tree spacing as a reference indicator, forests with tree densities of 120–200 trees per acre would need to be slowly thinned to achieve a relative tree density of 20–35 trees per acre as found on nearby old-growth stands. This could happen naturally through competition and mortality. It can also be stimulated through mechanical thinning because second-growth redwood has the ability to dramatically increase basal growth following thinning (Jameson, Reuter, and Robards 2005). Recruiting the structural elements commonly found in older forests is recognized as an important management objective in younger forest stands to address issues of biological diversity and forest integrity (Spies et al. 2002). In an old-growth forest, natural disturbances in the form of landslides, fire, and wind create and maintain gaps in the canopy. The gaps, allowing light to hit the ground, give young seedlings and saplings the chance to grow and thus provide variety in the age and physical structure of a forest’s trees. Thinning and group or “gap” cuts in a second growth forest are attempts to mimic natural disturbance. They relieve the forest’s unnatural, uniform growth created by the initial clear-cut operation. Single-tree selection with a focus of thinning from below and group selection with green tree retention are the main disturbance regimes used in Arcata. City staff has employed a blend of adaptive restorative treatments: variable retention (Franklin et al. 1997; Mitchell and Beese 2002), group selection, group selection with green tree retention, and single-tree selection. This has allowed them to learn from new information and key ecological indicators when designing new interventions. The forest is a shifting mosaic of patches, thinned areas, and gaps with the goal of allowing for tree ages in excess of one hundred to three hundred years. The development of a multi-layered forest canopy with a shade tolerant, shrub- and tree-dominated understory provides an indicator of the shift to an uneven-age condition (fig. 8.2). Efforts to increase species diversity have also included under-planting of shade-tolerant conifer species using transplanted stock from stands nearby. Other restoration projects include road decommissioning, erosion control, and improving fish passage opportunities at stream crossings.

Future Stand Conditions

A combination of commercial thinning, group selection and individual tree selection cutting will serve to move the forest towards a multi-age class situation with at least a three tiered stand structure. Although the gaps created by group selection will in effect be small even-age blocks, the retention of some green trees within the patch cuts will have the effect of creating some vertical diversity in the forest canopy. The group selection cuts will also serve to create patch diversity in stands when necessary to break up the existing homogenized even-age structure. The goal is to maintain a working forest to improve the forest ecology, provide revenue and demonstrate sustainable forest management for other timberland owners.

Areas cut under the single tree selection method in the Community Forest Tract will retain the current appearance of mid to late successional stage "park like" redwood stands with large (40" + diameter) trees that are resilient to impacts from wildfire.

Visual Quality and Aesthetics

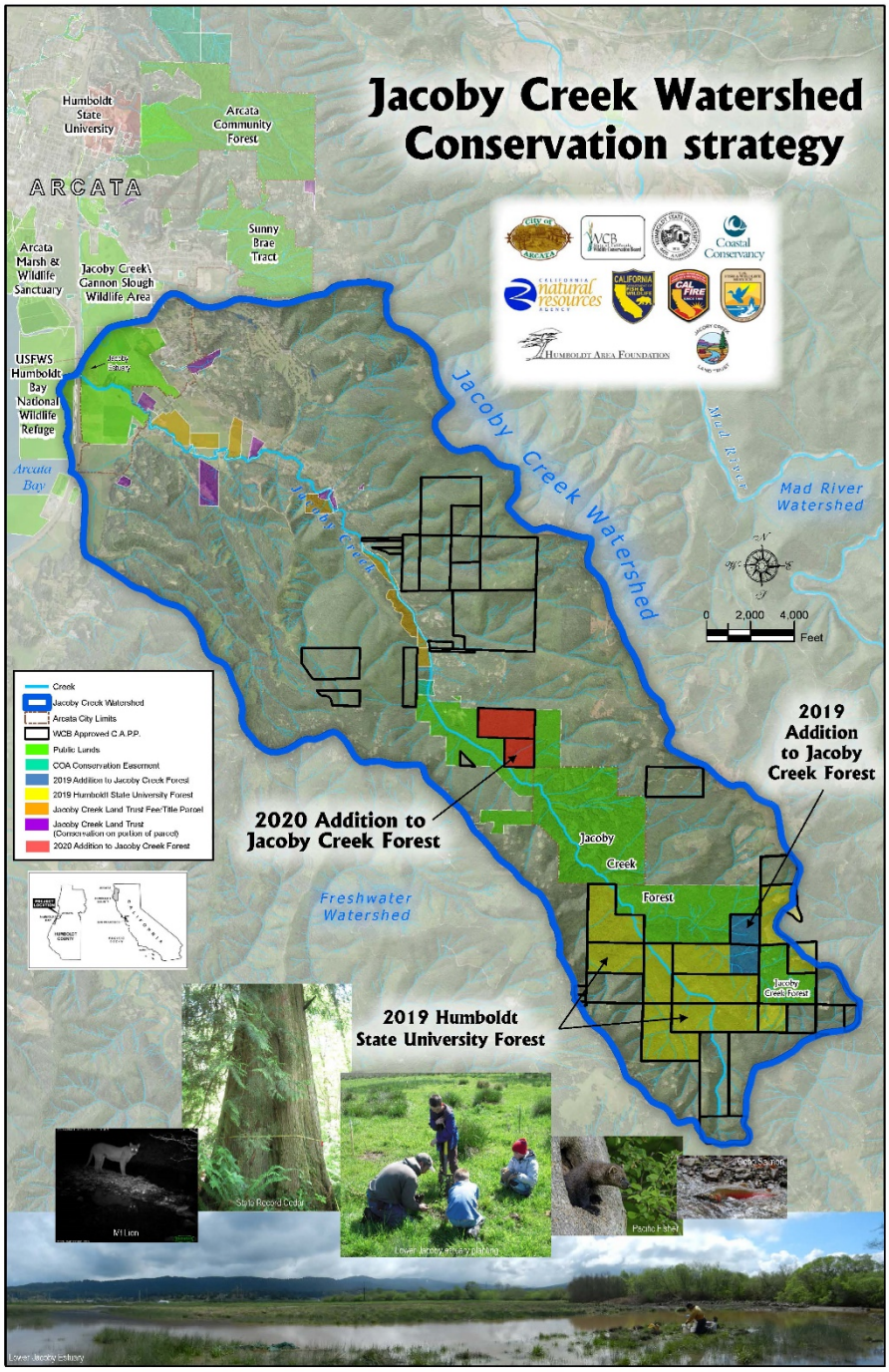
Current Direction

Visual quality on Arcata's forests fall within two categories, far view and near view. The Community Forest Tract and Sunnybrae Tract provide important view sheds from Highway 101 and much of the City limits. Forest management activities are tailored to mitigate visual impacts from a far distance. Limited use of vegetation buffers along roads and trails and chipping of slash has been used to mitigate visual impacts of logging.

Due to the remoteness and non-recreational use, the Jacoby Creek Forest is not subject to the same visual quality criteria of the more urban Community Forest. Only far view aesthetics are considered in management activities.

Plan Emphasis

The plan emphasizes a continual high level of visual quality in the Community Forest for its social benefits to the local community and to the thousands of recreational visitors. This emphasis is expressed by the overall maintenance of a continuous tree cover, vegetation diversity, use of small landings and long rotations (growing large trees).



Watershed Resources

Current Direction

Water quality is presently managed by implementing watershed improvement projects and by applying management practices which minimize erosion, sedimentation and flooding. In general, roads are out-sloped and rocked with ditches and road widths kept to a minimum. Strict restrictions are written into logging contracts to limit landing size, skid trails and soil compaction. Winter operations are not currently permitted in the City NTMP. The city decommission several miles of road in the Sunnybrae Tract and Jacoby Creek Tract with cost share assistance from state and federal agencies.

Projects have been implemented which include removing failed stream crossings and debris jams in addition to removing nonessential roads and trails. Shortcutting and rogue trails are active sediment sources for the creeks in the Community Forest. Efforts will be made to discourage their use.

Most soil types in the forests are coarse textured loam soils derived from the weathering of sandstone. All have moderate to high erosion hazard ratings when not vegetated. The Jacoby Creek Forest has extensive areas of unstable Atwell, "blue clay," soils that are inherently unstable. Management activities on these soils are subject to specific criteria.

Management Plan Emphasis
Conserve soil productivity and reduce erosion through appropriate measures and continue the implementation of watershed improvement projects.

Riparian Resources

Current Direction
Maintenance of riparian vegetation has been identified as a forest management policy because of its overall importance to the forest ecosystem. Riparian vegetation contributes twigs, leaves and other fine litter that are a critical component of the aquatic food base. Riparian vegetation moderates stream temperatures and root systems stabilize channel banks.

The vegetation of these communities is characteristically a variety of species including red alder, big leaf maple, western red cedar and others. There are several miles of Class I, (fish bearing streams such as Jacoby Creek) Class II (year round flowing streams such as Janes Creek) and miles of Class III (intermittent streams) riparian corridors on all tracts as well as areas of wet meadows, springs and bogs.

Riparian areas provide habitat for a greater number of wildlife species than any other habitat type. These areas serve as travel connectors between habitat types, provide food cover, microclimates and edge effects at adjacent forest margins.

Generally, streamside buffer widths have exceeded those required by the State Forest Practice Act.

Management Plan Emphasis
The plan establishes direction for riparian area management including maintenance and reestablishment of riparian vegetation. Management may include thinning densely-stocked young stands to enhance the development of larger conifers and to release suppressed conifers from taller hardwood.

Wildlife Resources

Current Direction
The City currently manages wildlife retention of all habitat types and habitat structural components such as snags and downed logs. No hunting is allowed in either forest. Current strategies include the maintenance of multiple age classes of trees and retaining corridors of uncut forest between patch cuts.

Special management areas include northern spotted owl nest activity areas including nest sites, and aquatic habitat that provides habitat for species of special concern, including northern red-legged frogs, foothill yellow legged frogs and ESA listed salmonids.

Management Plan Emphasis
Manage forests to provide habitat types that include some of the late seral stage characteristics and elements that can be found in an old-growth forest. Listed and non-listed species will be monitored and

wildlife habitat improvement projects will be initiated where necessary.

Vegetation

Current Direction
The Community and Jacoby Creek Forests can broadly be classified as second growth redwood forests. The species composition and density in most areas of both forests have been influenced by past management activities.

Within each forest there are plant species which occur in association with one another comprising the redwood-oxalis, redwood- sword fern and redwood-salmonberry alliances (Becking 1980). Given its location further inland, distinctive soils and elevational gradient, the Jacoby Creek Forest contains a species mix somewhat different from the Community Forest. Redwood is still a significant component of the forest but the Jacoby Creek Tract contains a higher cover of other conifer species including Douglas-fir, grand-fir, western hemlock and western red cedar than does the Community Forest Tract. In addition, the Jacoby Creek Tract supports a hardwood component not found in the Community Forest Tract, namely, tanoak, California bay and madrone.

Riparian areas can be highly dynamic and the plant species that occupy the riparian zone express the degree to which the setting changes through disturbance. Stream settings that are more stable support a conifer-dominated overstory. Less stable stream settings are dominated by red alder and less commonly, big-leaf maple.

Management Plan Emphasis
Practices will manage for structurally diverse (age and species) forest types. The native component of species found in the redwood forest type will be maintained or restored by controlling exotics that degrade native habitats and emphasizing a species mix that would occur naturally.

A flora or list of plant species will be maintained and updated over time. There is a need to more clearly define the plant associations.

Facilities

Current Direction
Facilities include roads, gates, trails, benches and picnic tables, bridges and culverted stream crossings, overhead utility transmission and distribution lines, city water tanks and a former dam.

Roads and Trails
Access to the City Forests is provided by city and county road systems. Within the forests, the City maintains a road and trail system including single track type recreational trails. Roads and trails are maintained at a level necessary for protection of resources and public safety. (Roads are discussed under the Timber and Watershed sections in Chapter III. Trails are discussed under the Recreation section of Chapter III.)

Right-of-Ways
One of the access points to the Community Forest Tract is via a right-of-way through Humboldt State University property and other private lands. The City has access rights through several private parcels for management of the Jacoby Creek Tract and Sunny Brae Tract. The City has a log hauling right of way through a 185 acre parcel north of the ACF.

Agreements for right-of-way access for others to use the City Forest road system are evaluated and

granted on a case by case basis.

Dams
A 50-foot dam located on Jolly Giant Creek in the Community Forest is maintained regularly by the City Environmental Services Department to ensure that it does not pose a safety hazard. Major retrofit work to provide for flow passage for a 500 year storm occurred in 2017 and the structure is no longer regulated as a dam by the California Division of Dam Safety.

Power Line Corridor
A 1.3 mile north-south utility corridor in the Community Forest contains 500-kv overhead power transmission lines. The Pacific Gas and Electric Company (PG&E) operates and maintains this transmission line and has been granted a right-of-way through the Community Forest.

Private water systems
There are known private water systems located downstream from the City forests that are within county unincorporated areas. These locations are mapped and forest management will take into consideration protection of surface water quality. There are also two known locations of unregistered and unpermitted private surface water diversions within the City forests that the City is monitoring with state and county regulatory agencies for compliance with environmental and public health requirements.

Fire Management (Protection)

Current Direction
Though fire risk in both forests has historically been low, the risk of wildfire ignition has increased due to the generation of slash (i.e. un-merchantable woody material) from timber management, timber operations, increased recreational use, illegal camping and development at the urban/forest interface.

Although fire is an integral part of the redwood forest ecology, wildfires cannot be allowed to burn due to the proximity to urban areas. Limited use of prescribed fire as a management tool includes eliminating large concentrations of slash at landings and roadsides, and low intensity understory burns to reduce fire hazards and mimic natural disturbance. Hot slash burns following logging operations for site preparation are avoided in order to prevent an increase in erosion and to allow for the slow release of nutrients into the soil.

The Arcata Fire Protection District provides suppression capabilities for the Local Responsibility Area (LRA) Community Forest, along with City forest management staff. The lead agency for fire suppression in the Jacoby Creek Tract (State Responsibility Area (SRA) is the California Department of Forestry and Fire Protection (CAL FIRE).

Management Plan Emphasis

Continue to coordinate with local and State agencies and non-governmental organizations for an updated fire prevention program that coordinates efforts across jurisdictions. Engage with the Humboldt County Community Wildfire Protection Plan and local Fire Safe Councils to partner on opportunities for wildfire, protection, education and implementation of fuel treatment projects. Fuel treatment projects include thinning, chipping of woody material for shaded fuel breaks and fire hazard reduction and prescribed fire as a management tool.

Current Concepts Shaping Arcata's Management

Ecosystem Management and Restoration

Historical Range of Variation
- pre-settlement conditions (Redwood NP) provides reference target

Ecological Restoration
- structure, function, composition and connectivity
-A combination of working forests, special management areas, and ecological reserves create a balanced approach

Disturbance Management
- fuel reduction, invasive control

CHAPTER 3

MANAGEMENT DIRECTION

This chapter establishes the goals of the management plan and the standards and guidelines by which these goals will be met. Management policies are presented by resource for each forest. The objectives of management policy are included and explained.

Multi-use road and trail in the Arcata Community Forest

FOREST MANAGEMENT GOALS: The goals for the Community Forests are:

1. *Maintain the health of the forest system, specifically, maintain the integrity of the watershed, wildlife, fisheries and plant resources, their relationships and the process through which they interact with their environment.*

2. *Produce marketable forest products and income to the City in perpetuity, balancing timber harvest and growth.*

3. *The Community Forest shall also be managed to provide forest recreational opportunities for the Community.*

4. *The City's forests shall serve as models of managed redwood forests for demonstration and educational purposes.*

The city directs management to be tiered to three elements of community-based forestry: ecological, social, and economic. The social component promotes engagement of all members of the community and builds local relationships of trust and reciprocity among diverse (and sometimes opposing) groups. It also enhances community knowledge and the skills necessary for planning and implementing sustainable forestry practices. The goal is not only more resilient forest ecosystems, but also more resilient communities, better equipped to respond to both challenges and opportunities. The eco- logical component involves the community in enhancing and restoring forested ecosystems, builds on local knowledge, and practices management and protection for the full range of social, ecological, and economic values. The economic strategy builds and sustains livelihoods based on natural resources. It often involves fostering small-scale, value-adding enterprises for timber. Economic benefits are often invested in the local community.

RECREATION AND AESTHETICS RESOURCE MANAGEMENT

POLICIES

The Community Forest (ACF) Tract and SBF Tract will emphasize dispersed, day-use opportunities. Recreational use shall not be allowed to impact other resources such as fish, wildlife or watershed. The Jacoby Creek Tract is not generally open for recreational use except by permit only.

CURRENT SITUATION

Community Forest and Jacoby Creek Tracts

Background

The City of Arcata recognizes outdoor recreation as one of the principal uses of the Community Forest. Dispersed recreation opportunities have been provided since 1980 and the demand for this type of recreation is expected to increase during the planning period. Demand for recreational use of the forest has increased with the population growth of Arcata and increased enrollment at Humboldt State University. In addition, it is the closest public forestland to the major population centers around Humboldt Bay. As a unique and major feature of the town, visitors to the area are also attracted to the Community Forest.

Located within easy reach of most of Arcata's population, the Arcata Community Forest including the Sunny Brae unit offers outstanding opportunities for dispersed recreation including: hiking, photography, bicycling, horseback riding, running, nature study and picnicking. A 19-mile network of recreational roads and trails provide non-motorized activities on a year-round basis. Part of the trail system includes the Samuel's conservation easement and other public access easements that pass through private property. Many of the City's trail projects are a collaborative effort between public agencies, non-profit organizations, volunteers and private landowners. The partnerships that have formed in order to help the City with stewardship and trail building and maintenance are an outstanding examples of cooperation.

Partnerships

City staff has fostered the development of groups to support recreation and education goals and to conduct trail patrols. These groups have partnered with the City and dedicated volunteers donate hundreds of hours of labor annually.

Groups such as the Trail Stewards, Bigfoot Cycling Club, HSU Natural Resources Club, and the Senior Resource Center coordinate volunteers for trail maintenance work and lead trail work days every year. Some of the popular volunteer workdays have 30-50 people in attendance. The relationships with these

organizations has been valuable to the City, allowing growth and improvements in the trail system.

Many of the recreational trails are used periodcially as logging skid trails and must be re-constructed following timber operations.

Trail planning is established within the Aracta Bicycle and Pedestrain Master Plan; Redwood Park Master Plan and the Forest Management Plan. The Forest Management Committee reviews proposals for new trail projects. Recreation and resource conditions can be expected to change over time. It is likely that unforeseen recreation needs, changes in visitor preferences and attitudes, new recreation technologies, or other resource issues will arise over the course of the implementation of the FMP. As a result, the FMP maybe updated and/or revised. Revision of the FMP will require that changes be fully documented.

Access to the Community Forest is served by trailheads located at West End Road, Fickle Hill Road, east of Redwood Park (via 11th and 14th Streets), California Street, Granite Avenue (east of the Humboldt State University residential halls), Margret Lane, Panorama Court, and Beverly Drive. Though located adjacent to the forest, recreational use of Redwood Park is not discussed in this plan. Redwood Park proper is managed under the Parks Master Plan.

Maps, publications, brochures and signs are used extensively to guide the forest visitor. Recreational maps are available at City Hall, the Arcata Chamber of Commerce, the City Library, and local bicycle shops. These services are important tools for the dispersed recreation management of the Community Forest. Digital recreational use maps are also provided and can be uploaded from the City website and used with applications such as Avenza.

City staff and volunteer docents conduct guided interpretive tours of selected areas of the forest upon request. Throughout the year, City staff provide educational tours and lectures to University classes, secondary and elementary school groups and other educational groups. Tours are typically designed to explain and interpret the changing landscape and the type of management that is being done on the ACF.

Trail user conflicts have developed with the increase in visitation and with horse and bicycle use on trails designated for hiking only. Steep downhill grades, blind curves and noise absorbing dense vegetation, contribute to "surprise" encounters on some forest trails. Efforts have been made to educate the mountain bicycle riders of the need to keep their speed reasonable on the downhill sections. By working with local bicycle clubs and through the distribution of a trail riding etiquette brochure, resource damage has been tempered.

Jacoby Creek Tract

Due to a lack of full public access, the Jacoby Creek Tract is not currently managed for recreational purposes except for limited access with special permits. Special permits are issued for docent led walks, research, education, cultural use, monitoring and educational field trips.

The Jacoby Creek Forest is located in an isolated section of land several miles from the contiguous city limits and its precise location is unknown to most of Arcata's citizens. The JCF is bordered by large private ownerships zoned for timber production (TPZ) and smaller rural residential parcels on the south and west..

Law Enforcement and Public Safety

The Arcata Police Department is the responsible law enforcement agent in the City Forests. Depending upon the situation, forest management staff on patrol typically contact forest visitors who may be breaking

rules in order to educate them and gain compliance. When this fails, the police rangers are contacted via cell phone or radio.

Often it is other forest recreational users who contact City Hall and the Arcata Police Department with complaints of illegal camping, or other activities that may be violations of the municipal code or other regulations. The Samuel's Conservation Easement and portions of the JCF Tract are not within the Arcata City Limits. The County of Humboldt Sheriff Dept. is the responsible law enforcement agency for those areas.

For emergencies including reporting forest fires, forest users should call 911. To report non-emergency illegal activities forest users can call the Environmental Services Dept. (707) 822-8184 and or the Arcata Police Dept. at (707) 822-2428.

The Arcata Volunteer Fire Department responds to incidents within the Local Responsibility Area (LRA) and within the State Responsibility Area (SRA) CAL FIRE is the lead responder. Often via mutual aid agreements, both fire agencies work together in responding to fires within the greater ACF boundaries.

OBJECTIVES

Recreational management shall continue to provide dispersed use with limited developed recreational sites. Management objectives will provide for cost-effective dispersed recreation opportunities, user safety, solitude and a visually pleasing forest environment. The City will seek grant funding and continue to coordinate with volunteer groups to contract and maintain a high quality trail system.

Dispersed Recreation

1. Management efforts shall attempt to resolve trail user conflicts through education, re-designation of trails, maintenance and construction of deep rolling dips for use as speed control and periodic trail patrol. The emphasis will be on education so that trail users adopt appropriate trail etiquette and self-police the trail system by notifying other trail users of observed violations.

2. New trail routes will be planned to meet the growing dispersed recreation demands and to reduce user conflict.

3. Disabled access will be provided by upgrading as many low gradient trail sections as possible to meet the Americans with Disabilities Act (ADA) standards For inquiries concerning the use of a power-driven mobility device on a Community Forest trail, pursuant to Title II of the Americans with Disabilities Act, § 35.137, Mobility devices, please contact the Environmental Services Department at (707) 822-8184.

4. Steps will be taken to ensure that recreational use is consistent with maintaining resource values. Illegal camping activity is to be aggressively controlled.

Developed Recreation

5. Developed recreation will be limited to the existing interpretive facilities. Redwood Park provides extensive developed recreation adjacent to the Community Forest including picnic, playground and public meeting rooms. These facilities will continue to serve the needs for that type of recreational experience while the majority of the Community Forest provides a dispersed low intensity emphasis that is compatible with the forest ecosystem. Private motorized vehicles and public buildings will not typically be allowed.

Visual Resources

6. The overall management effort will strive to maintain a visually pleasing forest setting that serves to enhance the recreational experience, local tourism and provide an attractive visual backdrop to the surrounding community.

The City typically uses the California State parks Trail Manual, the US Forest Service Trail Manual (FSM 2355), the USDA Forest Service Trails Management Handbook (FSH 23.09.18), USDA Standard Specifications for Construction and Maintenance of Trails (EM-7720-103, USDA/FHWA, Equestrian Design Guidebook for Trails, Trailheads, and Campgrounds, and the 2004 International Mountain Biking- Trail Solutions Guide.

Maintenance Prioritization for Existing trails:

1st Priority
Correct unsafe situations - This could mean repairing impassable washouts along a cliff, or removing blowdown from a steep section of a trail.
2nd Priority
Correct issues causing significant trail damage - Such as erosion, sedimentation, and heavy use
3rd Priority
Restore or reconstruct the trail to the planned design standard - This means that the ease of finding and traveling the trail matches the design specifications for the recreational setting and target user. Actions range from simply adding markers or signage to complete reconstruction of eroded tread or failed structures. Whatever the priority, doing maintenance when the need is first noticed will help prevent more severe and costly damage later.

Volunteer Programs

Volunteer groups associated with ACF have been instrumental in maintaining ACF recreational trails. The ACF volunteers have an interest in both ACF and natural resources in general, and enjoy sharing their experiences with others. The City will continue to cooperate with volunteer groups to maintain and construct trails, remove litter, removal invasive plants, and plant trees and provide specialized interpretive programs.

STANDARDS AND GUIDELINES

1. (S) Traveling in the Community Forest and on adjacent lands managed for recreational use by the City is only allowed on designated forest roads and trails.

2. (S) Motorized vehicles are prohibited in the forests except forest management, public safety or for research purposes approved by the City. The definition of motorized vehicles includes gas powered machines and electric bikes (E-bikes or pedal assist bikes) except for Class I bikes that are not capable of speeds greater than 20 MPG.

3. (S) Group events must apply to the Environmental Services Department for a permit thirty (30) days prior to the event.

4. (S) Livestock and grazing is not permitted, tethered or free ranging. Horses, mules, and pack stock such as lamas are permitted for recreational use or to support forest work activities such as trail maintenance.

5. (S) Commercial collection of native plant material such as mushrooms, transplant stock and shrub greenery is not allowed except along the power-line right-of-way and along alignments of proposed logging skid trails or new road segments.

6. (S) A special use permit is required for studies or scientific investigations conducted in the forests that

involve collection of plants, trapping of animals, plant collection, invertebrate collections or setting up instrumentation or flagging. Require that as a condition of the permit, the investigator provide the City with a copy of the report or data collected.

7. (G) Work with adjacent landowners to discourage and resolve trespass issues.

8. (S) No firearms or hunting is allowed in the Community Forest.

9. (S) Camping is not allowed. The Community Forest will be patrolled regularly to locate illegal campsites.

10. (S) Cyclists are prohibited from attaining unsafe speeds on downhill grades by which the safety of other recreational users or the cyclist themselves are jeopardized. The City shall commutate the importance of this safety standard to local mountain bike shops and cycling clubs.

11. (G) Create or modify new trails that would reduce user conflicts by directing recreational users onto other paths.

12. (S) Timber harvest operations in the Community Forest and Jacoby Creek Forest shall be suspended during the weekends and federally recognized holidays except for Columbus Day. Logging operations will cease after 5:30 pm in the Arcata Community Forest and Sunny Brae tracts to minimize impact recreational users.

13. (S) Provide for the needs of physically disabled persons in facility designs in part of the trail system.

14. (G) Discourage recreational use access to the Jacoby Creek Tract through the maintenance of signs and gates unless legal and permitted access is obtained through adjacent properties. Access to the JCF will continue to be granted by permits issued by the Environmental Services Department for special projects, education, research, docent led walks, group events and scientific purposes. Permits for general recreational use will be discouraged.

15. (S) Improve, relocate or close trails where recreational traffic is causing water quality or other resource degradation.

16. (G) Environmental degradation caused by over use of recreational facilities shall be maintained and controlled through seasonal use restrictions and closure.

17. (S) Develop a volunteer patrol team to educate forest users, reduce user conflicts and provide trail maintenance.

18. (G) Random trespass entry to the Community Forest from city or county roads and private ownerships will be discouraged through maintenance of vegetative barriers, logs, and/or clearly visible boundary signs.

19. (G) Incorporate measures into timber management activities that reduce far view and close view aesthetic impacts. This may be done using road side buffers along heavily traveled roadways or by layout of harvests to minimize view from residential areas.

20. (G) Recreational sites and/or facilities shall be designed to reduce annual maintenance costs and to discourage vandalism.

21. (S) Identify the locations of rare plant occurrences and minimize impacts during trail construction.

22. (G) Review and update forest recreation maps as needed and provide for online versions of recreational maps.

23. (G) Provide interpretive services that explain the Community forest history, management programs and forest ecology. Services may be in the form of self-guided trails, brochures and maps or docent-led tours and are to encourage public use of the Community Forest and solicit opinions from the public to improve the management of forest resources.

24. (G) Trail maintenance will include:

a. signing entrances and trailheads
b. all necessary measures to ensure resource protection
c. maintaining trail surfaces and structures for safe use

25. (G)Construct trail bridges as needed using materials and methods that will best protect the forest ecosystem.

26. (G) Remove unauthorized/rogue trails.

27. (G) Trailhead kiosks should be installed and maintained at primary access points. Kiosks should include the following:

a. rules and regulations governing the use of the forest including right-of-way;
b. emergency information;
c. special warnings about hazardous conditions;
d. visitor awareness information; and
e. trail system maps

28. (G) Regulatory or informational signs may be used in situations where control of excessive resource damage is needed and other corrective actions are unsuccessful.

29. (S) Boundary signs shall be placed at all established access points.

30. (G) Maximize hours that trails are open for public use, consistent with safety and other goals. Manage trail closures and special events to minimize limitations to trail accessibility.

31. (S) Design trails to comply with applicable local, State, and Federal master plans, design guidelines, environmental mitigation, laws, permits, or accepted standards.

32. (S) Design trail system alignments within sensitive riparian and other natural areas to minimize impacts and enhance the environment. All new trail segments must be surveyed for sensitive plants.

33. (G) Conduct periodic user surveys and needs assessments of forest recreational users for future planning efforts.

34. (G) Continue to support, and work to expand volunteer programs to enhance recreation, interpretation and patrol.

35. (G) Record and compile descriptions of all reported violations or nuisances caused by public users at the ACF or on adjacent ownerships including, but not limited to, trespass, vandalism, littering, and noise. Implement restrictions on public use if needed.

36. (G) Recreational facilities will be maintained with minimal development, preserving the rustic and informal characteristics of the Forest. Periodic assessments will be made to ensure that facilities meet users' needs while remaining as natural as possible.

OPPORTUNITIES

The City has opportunities to improve many aspects of recreation in the Community Forest.

1. Explore potential upper forest access and other easement possibilities to expand the trail network to connect with outlying communities.

2. Improve horse trailer parking and construct limited numbers of road/trailside benches.
Recreation

3. Implement aspects of the Redwood Park Master Plan at ACF park interface zone.

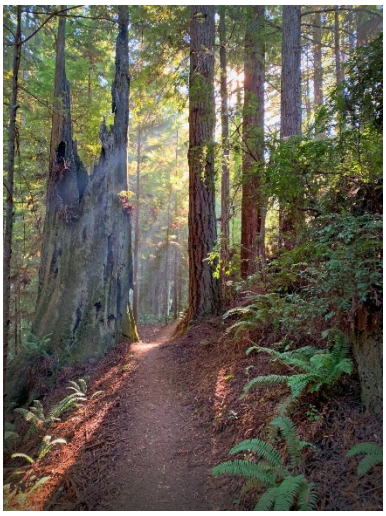
4. Seek alternative funding sources as contributions toward development and operation of the ACF. Supplemental funding from grants and private donations may be used for interpretive presentations, display development, facility improvements trail development and land acquisitions.

5. Evaluate the need for a new Recreation and Trails Master Plan for the ACF to improve the trail network and recreation opportunities in the Forest.

6. Members of the public have expressed interest in developing full recreational access to the Jacoby Creek forest along the existing trail next to the creek, or via a larger regional trails system. This is an opportunity that could be explored only through the coordination with downstream property owners the County of Humboldt and Humboldt State University and the resolution of the following issues:

    a. impacts on wildlife and erodible soils
    b. potential for increase wildfire risk
    c. potential trespass onto adjacent private property
    d. the City's ability to provide City services
    e. improved access over across other ownerships

Recreation and resource conditions can be expected to change over time. It is likely that unforeseen recreational needs, changes in visitor preferences and attitudes, new recreation technologies, or other resource issues will arise over the course of the implementation of the FMP. As a result, the FMP may be updated and/or revised.



Trail #19 ACF Photo credit: Steven Vander Meer

TIMBER RESOURCE MANAGEMENT

POLICIES

To insure the sustainable and long-term production of forest products, the rate of harvesting, must not exceed the rate of production. Long-term productivity refers to the continuing ability of the forest's to produce timber while retaining the associated values of watershed, wildlife, soils, recreation and aesthetics. This is dependent upon the use of management practices that do not allow for the deterioration or impairment of soil productivity or the alteration of the natural landscape beyond its ability to recover. For planning purposes long term means that exceeding fifty years.

CURRENT SITUATION

Background: Historical Perspective

Current direction for timber resource management was established by the Arcata Community Forest/Jacoby Creek Forest 1994 Management Plan as well as Non-industrial Timber Management Plan 1-99-NTMP-033 HUM. "Management Programs" such as timber, watershed and recreation are described in general terms. The FMP was designed for periodic updates and amendments.

There are approximately 2,200 acres of forestland currently designated as suitable for timber management. The remaining 245 acres of forestland is either reserved for other uses including recreation, wildlife and streamside protection, or is classified as unsuitable due to slope instability, power line right-of-ways or unable to support timber growth. 778 acres of the timber base is part of registered carbon projects that has required re-inventory periods of 12 years as well as separate volume growth tracking requirements. City forest inventory information is stored at the Environmental Services Department 736 F Street Arcata, CA. 95521 eservices@cityofaracta.org.

The forestland designated for timber management has a current timber volume of approximately 100 MMBF excluding old growth timber. It is recognized that many factors not related to tree growth will influence harvest levels in the future. These influences can include: changes in forest practice regulations, increased wildlife and habitat protection, expansion of recreational resources, market fluctuations, and extraordinary

wind or fire damage.

Sustainable harvest levels are a goal of Arcata's forest management plan, and it is a continuing challenge to adapt to new information from forestry research as well as to feedback from plan monitoring processes to ensure this goal is being achieved. By re-measuring permanent plots that include timber growth and other ecological habitat parameters, as well as by pursuing a new emphasis on managing for carbon sequestration, sustainability benchmarks will be reviewed so that corrections can be made as necessary.

Timber Stand Characteristics

All three tracts forests are located within the redwood forest type and are classified as second growth forests as the original old growth was previously logged. The Arcata forest is Site Class II (site index 167, 50-year base age) and Site Class III redwood forest type. Conifer species include redwood, Douglas-fir western hemlock, Sitka spruce, western red cedar, and grand fir. Inland portions support tanoak (*Lithocarpus densiflorus*), madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), and bigleaf maple (*Acer macrophyllum*). Red alder (*Alnus rubra*) is a common hardwood species found within the riparian zones. The primary natural disturbance in redwood forests, unlike mixed-conifer and most other California forests, is neither from fire nor insect damage, but rather blowdown from wind events. Other threats to the ecological integrity of the Arcata Community Forest include urbanization on the forest edge, invasive plants, and potential severing of ecological corridors that link the Community Forest to other intact forest areas to the east.

The present stand characteristics of each forest have been shaped by the timber harvests of the past and contain the following components:

Jacoby Creek Tract Forest

1. seedlings and saplings 1-10 years old
2. pre-commercial size pole timber
3. small diameter conifer saw logs 30-40 years
4. dense mature conifers 80-100 years
5. patches and scattered residual old growth timber 150 years+
6. hardwood dominated areas of poorly formed soil horizon

Presently the Jacoby Creek Tract is the only area with significant hardwood volumes and even there those species amount to less than 10 % percent of the total standing volume. Incidentally harvested hardwood has been sold to the local chip market or cut into firewood. The City sells 3-5 cords of firewood per year and the funds are used for trail maintenance supplies and to support local nonprofit groups who assist with trail work. Riparian hardwood such as alder and big leaf maple are not harvested within the watercourse zones and form a significant forested corridor along the main stem of Jacoby Creek.

Current management has emphasized retaining hardwood for their wildlife and ecological values unless they are damaged or knocked down during harvest. If a viable market develops in the area, it may warrant more management emphasis on hardwood for the saw log market.

Community Forest

1. seedlings and saplings 1-10 years old
2. pre-commercial sized pole timber
3. large diameter mature timber to 130 years old
4. widely scattered residual old growth 150 years +

The overall merchantable conifer volume on the Community Forest is 92% redwood, 4% Douglas-fir, 4% grand fir/Sitka spruce. There are very few western hemlocks and western red cedar trees located on the Community Forest.

For planning purposes the Community Forest has been divided into management units that are defined by logical boundaries such as roads, ridge tops or creeks so that they may be located on the ground. The purpose of the management unit designation is to track timber harvest data, inventory data and other site specific information that needs to be referenced to a geographic location. Most forest data are stored according to management unit for ease of tracking and retrieval.

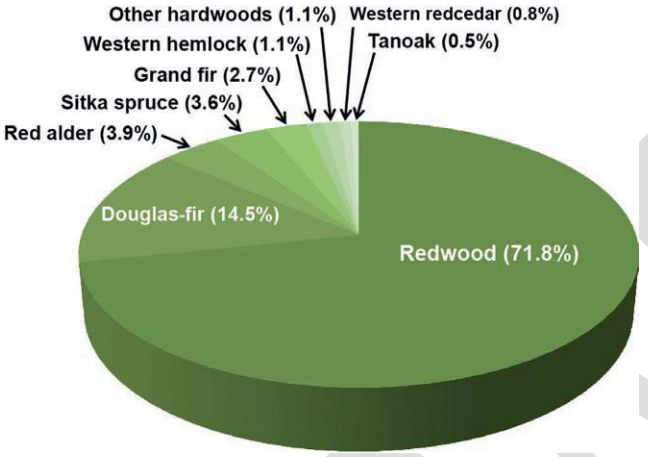


Figure 2. Current species composition by basal area, Arcata Community Forest, California

Growth and Yield

TABLE 8.1 Area (ac) of Forest Type by Structural Groups, Arcata Community Forest, California, United States of America

Forest Type	Structural Group					
	Open	Young (25–40 years)	Mature (41–70 years)	Older Mature (70–135 years)	Old Growth (150 years+)	Total
Redwood type		315	1,025	1,006	18	2,354
Riparian			12	25		47
Meadow, roads, power lines, rock pits	43					44
Total	43	315	1037	1,031	18	2,445

The Community Forest hosts an array of permanent continuous forest inventory ecosystem monitoring plots that were installed in 1985. The 0.2 ac (0.08 ha) plots are re-measured every 10-15 years. Measured ecosystem components include down logs, snags, seedling count, tree diameter, height, decay class, soil condition, live and dead carbon pools, lichens, fungi and bryophytes, wildlife use, and understory vascular plants. Plots in the old-growth reference stands are contrasted with the data in the Community Forest as

part of a monitoring strategy. The data from these plots and other timber cruises and inventories provide the basis for the information contained in this plan and appendices. The City has recently reestablished (2) one acre growth plots established in 1927 next to the Redwood Park parking lot at the end of 14th Street. These one-acre plots were initially installed in 1927 by Berkeley professor, Dr. Woody Metcalf, and provide a valuable data set for growth and stand modeling.

Inventory updates with their associated maps, will serve as the foundation for the next round of timber planning. These well distributed plots are re-measured on five year intervals. Data collected includes:

1. DBH to nearest 10th inch
2. total heights of all trees
3. understory vegetation by species and cover class
4. past 10 year diameter growth increment
5. information on snags/down logs/ soil condition

Diameter height curves have been constructed for Arcata's forests based on measurements of over 2500 conifers of all diameter classes. A linear regression was run on the relationship between heights to the logarithm of the diameter and yielded an equation used for City forest inventory work.

Site index is a measure of the capability of a particular site and soil type to grow commercial quality timber. Site index is based upon two factors: tree height and age.

The site index averages 170 on the Community Forest Tract and 160 on the Jacoby Creek Tract. For example, a 100 year old tree in a dominant canopy position growing in the Community Forest can be expected to be 170 feet tall.

Twenty years of harvest data has been used to estimate net vs. gross volumes from defects not visible to timber cruisers and to confidently predict breakage factors from site specific locations. Defect averages 5% on the Community Forest Tract and 7.5% on the Jacoby Creek Tract timber.

Silviculture and Harvest Methods

Silviculture systems refer to the management processes by which forests are harvested, tended and replaced, resulting in a stand of a distinctive form. The systems are classified according to the types of cuttings that remove trees and provide for regeneration as well as the type of forest stand produced. Current harvest practices are based uneven-age management.

Uneven-aged management will continue to be the forest silviculture for the ACF.Selection: Under the selection method, trees are harvested individually or in small groups sized from .25 acres to a maximum of 2.5 acres. Single tree selection will continue to be the primary prescription for the ACF.

Commercial thinning: Commercial thinning is the removal of trees in a young growth stand to maintain an increase average stand diameter of the residual trees and to promote timber growth. Thinned stands will be managed by the single-tree selection or group selection methods during future harvests.

Two goals of these modified silvicultural treatments at the stand level include retention of structure and stand complexity at the time of harvest to speed up the recovery of a particular stand while attempting to mimic small scale natural disturbance such as individual tree mortality. Studies in the Douglas fir forests of the Pacific Northwest indicate that recovery of a particular level of structural complexity (and thus habitat for most species typical of mature forests) may be 2-3 times faster when significant structural legacies are retained following harvest (Franklin & Spies, 1992).

Harvest methods include: High lead cable yarding by which a yarder is positioned on a road or stable location and logs are pulled (yarded) uphill with at least one end in suspension. This method is used on steeper terrain and results in less ground disturbance than other harvest methods. Ground based yarding is typical for slopes less than 65% especially where existing skid rails are present. Tractor or rubber tired skidders are the primarily ground based yarding machines used. Tethered logging systems will also be allowed on steeper ground as the Forest Practice Rules allow.

2019 timber harves. ACF Tract

The intensity of the cut, the rotation age and/or cutting cycle are probably the most important silvicultural considerations in deciding the direction of the timber management program. Rotation age refers to the number of years required to grow trees to a specified condition for maturity or harvest. Rotation age is usually associated with even-age systems by which all of the trees in a particular stand are harvested at the same time. Cutting cycle means the number of years between successive cuttings and is usually associated with uneven age systems such as selection. The cutting cycle is usually constant from one cycle to the next, but can be adjusted a year or two to take advantage of market variability or changes in timber prices. Cutting intensity refers to percentage of trees or volume harvested from a stand. A 20% cut would be classified as a 'low' intensity cut and a cutting 100% of a stand would be 'high' intensity. Intensity can be adjusted to the site specific parameters such as slope, aspect and stand dynamics.

Other silvicultural methods are employed in order to increase stand complexity, and by structural objective, they include the following:

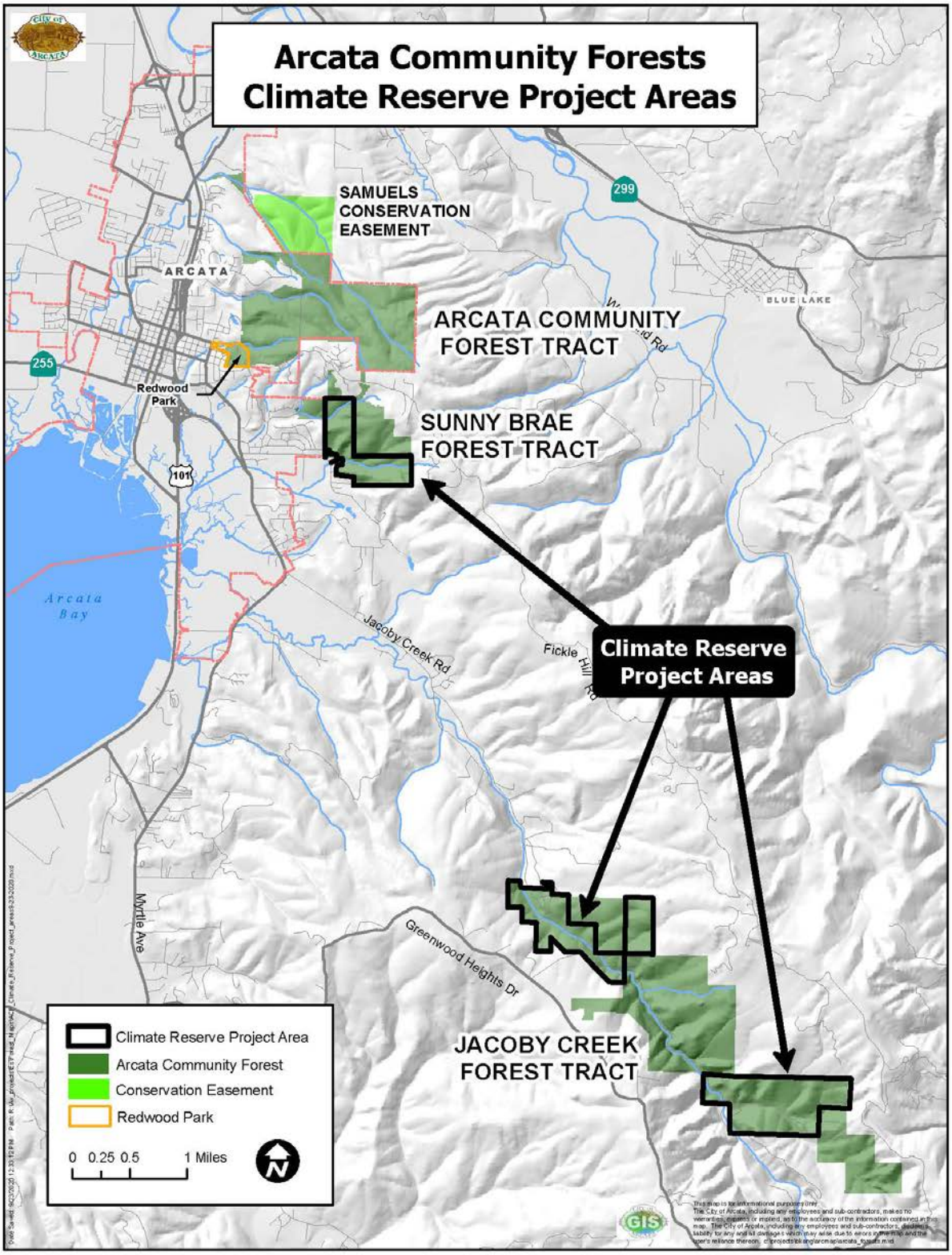
1. *Multi-layered canopies*: Modified single-tree selection timber harvests, release of advanced regeneration, establishment of new redwood tree cohorts, planting of shade-tolerant species (western hemlock, grand fir, etc.) in areas where they were eliminated years ago, and retention of some trees with complicated re-sprouted or reiterated tops.
2. *Elevated large snag densities*: Girdling of selected intermediate to co-dominate trees, usually Sitka spruce, grand fir, and Douglas-fir.
3. *Elevated downed woody debris densities and volumes*: Felling of trees and retention of large broken pieces to create large downed log material, and augmentation of debris by hauling in cull logs from nearby land clearing operations.
4. *Variable retention density harvests*: Thinning from below and harvest of stump sprout clusters with retention of dominant sprout trees, variable density harvests, reserve areas along watercourses, and modified group selection harvests (less than 2 ac (0.8 ha)) in size.
5. *Activities to re-allocate basal area to larger diameter classes*: High target basal area (96–157 ft2 per ac (22–36 m2/ha)).

Fortunately, there are reference stands of old-growth redwood in the region that can serve as blueprints for

Arcata's Community Forest management trajectory. Many of the missing ecological qualities in the Community Forest can be found in nearby Redwood National and State Parks. Recruiting the structural elements commonly found in older forests is recognized as an important management objective in younger forest stands to address issues of biological diversity and forest integrity. Forest structure refers to species composition and the physical arrangement of trees, including the sizes, ages, spatial arrangement of gaps, and the sizes, heights, spatial arrangement of trees, snags, and dead and down material. In an old-growth forest, natural disturbances (landslides, fire, and wind) create and maintain gaps in the canopy. The gaps, allowing light to reach the ground, give young seedlings and saplings the chance to grow and provide variety in the age and physical structure of a forest's trees. Thinning and group or "gap" cuts in a second-growth forests are an attempt to mimic natural disturbance. It relieves the forest's unnatural, uniform growth created by the initial clear-cut operation. Single-tree selection with a focus of thinning from below, and group selection harvests with green-tree retention are the main disturbance regimes used in the Community Forest. There has been a blend of restorative treatments that are considered adaptive management practices, in that City staff attempt to learn from new information and indicators when designing new interventions. The forest is a shifting mosaic of patches, thinnings, and gaps with the goal of allowing tree ages to exceed 100–300 years. The development of a "layering" effect in the tree canopy is one indicator of the shift to an uneven- aged condition. Efforts to increase species diversity have also included under-planting of shade-tolerant conifer species using transplanted stock from stands within or in close proximity to the Community Forest.

Other Forest Products

Firewood and carbon offsets are the only other forest products that are periodically sold. On occasion slash is shipped to a biomass facility when the markets are favorable and when slash concentrations need to be removed from landings for aesthetic reasons.


Arcata Community Forests
Climate Reserve Project Areas
SAMUELS
CONSERVATION
EASEMENT
ARCATA
ARCATA COMMUNITY
FOREST TRACT
SUNNY BRAE
FOREST TRACT
Redwood
Park
299
255
101
BLUE LAKE
Arcata
Bay
Jacoby Creek Rd
Fickle Hill Rd
Climate Reserve
Project Areas
Myrtle Ave
Greenwood Heights Dr
JACOBY CREEK
FOREST TRACT
Climate Reserve Project Area
Arcata Community Forest
Conservation Easement
Redwood Park
0 0.25 0.5 1 Miles
GIS

Reforestation

Typically, cut redwood trees re-sprout vigorously. In addition to the stump sprouts, two year old redwood and Douglas-fir bare root seedlings are planted the winter following logging operations. Planted seedlings are grown from seeds collected from appropriate seed zones according to zone and elevation. Small quantities of local shade tolerant conifer transplants (western hemlock, western red cedar and grand fir) are dug up from dense seedlings pockets areas and planted in riparian areas to increase species create future wildlife trees and increase carbon storage.

Stocking surveys have shown survival success in excess of 90%. There are no backlog areas to reforest within the ACF. There are some area of low stocking in some of the more recently acquired lands that could be improved with inter-planting with conifers.

Natural reproduction has occurred within many harvested areas in the Jacoby Creek Tract. Natural regeneration has included more shade tolerant species including western hemlock, grand fir and Douglas-fir. Natural seedlings are less prolific in the Community Forest but do occur in the gaps that receive sunlight. Sitka spruce is a prolific natural seeder within many areas of the ACF including those areas under the shade of the canopy.

Generally, seedlings are planted on a 10'x10' spacing but recently planters are instructed to plant seedlings in varying densities based on position on a slope, steepness of the slope as well as the slope aspect to achieve horizontal heterogeneity.

Timber Stand Improvements

The City has conducts pre-commercial thinning and conifer release on selected areas that were harvested using group selection. The objective of thinning is to control stocking levels, remove poorly formed trees, provide early habitat for mature forest wildlife, and increase growth of residual trees. The proper spacing of these developing trees will be an important factor in maintaining a high annual growth rate. Pre-commercial thinning on the JCF tract must be carefully planned and considered as past practice has shown an increase in bear damage following thinning operations.

Fire Protection

Although natural fires are uncommon on the City Forests, fuels from timber harvesting activities and a high level of recreational use makes fire a real possibility. Further compounding the situation is the urbanization along the perimeter of the Community Forest and Sunnybrae Tracts. There is a history of small fires caused by illegal campfires in the Community Forest Tract.

The City's standard practice of lopping and scattering slash material and leaving it on site leads to a short term fire hazard but is not considered a high risk in these moist coastal redwood forests. Some prescribed fire may be necessary to alleviate fuel loading near residential areas and along roads. This may be accomplished under the right conditions through piling or small broadcast burns.

Within the ACF, fires are controlled by City staff and the Arcata Volunteer Fire Department with CALFIRE called in for assistance if necessary under a mutual aid agreement. Areas within the City limits are mapped as Local Responsibility Area (LRA) and areas outside the City limits are mapped as State Responsibility Area (SRA).The current road system in the Community Forest provides good access for fire control vehicles to all sections of the forest. The City maintains a cache of fire tools for fire line construction and has some trained personnel on staff to assist the Arcata Volunteer Fire District as necessary.

The Jacoby Creek Tract tends to have less summer fog and warmer summer temperatures than the Community Forest and Sunnybrae Tract's and thus fire risk there is greater than in the lower elevation tracts.

Management of fuels along the wildland urban interface will include maintaining shaded fuel breaks and education and outreach to adjacent residential property owners regarding forest fuels management practices. The City will participate with the local Fire Safe Councils (FSC) and assist with implementation of the Community Wildfire Protection Plan.

Roads Access

A permanent road system has been completed which allows access to the majority of the tracts. Most of the permanent road system has been surfaced with rock and is suitable for all season pickup truck access. Access to the Section 30 portion of Jacoby Creek tract is via Fickle Hill (county) road and through Green Diamond Resource Co. (GDRC) property on a permitted agreement basis that is limited to vehicular access for forest management purposes only. Other deeded access to the Jacoby Creek Tract is via lands owned by Humboldt State University, off Greenwood Heights Road and via Jacoby Creek Road.

Primary access to the ACF is via the Fickle Hill Road within the city limits of Arcata. Vehicles and equipment associated with timber harvesting must enter and exit the ACF at the Fickle Hill Road gate, or at the West End road access gate via a road easement. For fire control and other emergency, access to the ACF can be also gained from the east end of Granite Ave, Diamond Drive, California Street and 14th Street. The SBF has road access via Fickle Hill Road, Beverly Drive, Panorama Court and Buttermilk Lane.

Roads are maintained annually, or as needed.

No new permanent road construction is anticipated within the next 10 years as the current road system should allow access for any planned timber harvest.

Sale of Timber Products

Sawlogs are the principal commodity produced on both forest tracts. Limited amounts of hardwood have been sold for the chip market. Logs sold to date have been milled in California or Oregon. The City is prevented from exporting logs per federal Department of Commence restrictions for raw log exports.

Delivered log timber sales are conducted on a competitive sealed bid basis. Timber sale agreements are based upon delivery of a certain quantity of logs to the mill. The City is paid for net log scale and log purchasers are require to pay the Board of Equalization Timber Yield Tax. This is commonly referred to delivered log price. A separate agreement is entered into with the Licensed Timber Operation (logger) whose contract is supervised by the City's Registered Professional Forester (RPF) or his or her designee. It is possible that in the future stumpage sales could be considered. A stumpage sale is when a bidder purchases the logs "at the stump" and implements the logging and log transport.

While harvests from the City forests are relatively insignificant when compared to the total demand for timber in Humboldt County, it is recognized that the forest products industry is becoming increasingly dependent on harvests of timber from non-industrial forestland owners. In addition due to the size and quality of the timber grown on the City forests, demand for Arcata's timber should increase with time.

Pests

Pests are insects, animals, weeds or diseases that adversely affect forest resources. Although pests are not a serious concern on the City forests, certain pests can cause tree mortality, reduce growth or affect seed production. Pest problems are often the result of complex forest ecosystem interactions. Young trees under stress from logging damage or prolonged drought are more susceptible to problems.

Douglas fir trees closest to the coast tend to become affected by *Fomes pini* (conk) when they reach larger size class of 36" or greater.

Humboldt County is an area that has been declared by the Board of Forestry and Fire Protection to be a Zone of Infection for Sudden Oak Death Phytophthora ramorum (SOD). No SOD has been observed in the Arcata Community Forest. The plan area currently contains the following SOD host species: Coast redwood (*Sequoia sempervirens*), Douglas-fir *(Pseudotsuga menziesii*), bay laurel (*Umbellaria californica*), rhododendron (*Rhododendron* sp.), huckleberry (*Vaccinium ovatum*), bigleaf maple (*Acer macrocphylum*), rhododendron (*all Rhododendron species*), Cascara (Frangula purshiana) and western starflower *(Trientalis latifolia)*.

Weeds include pampas grass, Scotch broom, English ivy, Canadian thistle and other species that have been introduced and grow outside their natural habitat. These species have little or no food value for wildlife and can compete with planted conifer seedlings.

Weeds have been controlled to a limited extent by hand cutting and removal. Pesticides and herbicides have not been used on the City forests and are prohibited on City public grounds by ordinance.

Animal pests include: black-tailed deer that browse on unprotected leaders of conifer seedlings; wood rats that can girdle small trees; and black bear that can strip the bark from young pole sized trees. Girdling of young conifers by black bear in the Jacoby Creek Tract is the only significant animal pest issue

OBJECTIVES

Management objectives have been formulated with the following assumptions. Areas on which other resource values are higher than timber values have been removed from the suitable timber base, or timber management has been modified. Recent research has improved our understanding of the functioning of complex forest ecosystems. It has become apparent that the forest management objectives should not focus on optimization of tree growth (production) at the expense other related forest values.

1. Manage the forest resource by emphasizing larger and older (higher value) trees.

2. Manage forest stands so that they contain a balanced proportion of young, intermediate and mature trees and a variety of successional stages with an emphasis on increasing the amount of older forest structure

3. Attempt to schedule timber harvests to coincide with high market prices to maximize economic efficiency of each timber harvest operation.

4. Maintain or increase the amount of forested acres on the ACF.

5. Take advantage of opportunities to increase forest growth through reforestation and timber stand improvements.

7. Involve the community in the forest planning and management process.

8. Prescribe flexible silvicultural methods that enhance the health and vigor of the forest while maintaining from aesthetic and recreational values.

9. Encourage research, cultural and scientific use of the forests and provide information and educational material to the public.

10. Submit for approval, amendments to the existing Non-industrial Timber Management Plan (NTMP) or long-term timber harvest plan to cut long-term management costs and allow for maximum management flexibility.

STANDARDS AND GUIDELINES

Coordination between the timber program and other resources is essential if forest goals and objectives are to be met. The major areas that have a potential for conflict with timber management include visual, watershed, wildlife and fisheries.

It should be noted that future State Forest Practice rule changes or other state or federal rules or laws governing forest, water and wildlife shall have precedence over the standards and guidelines in this plan if they are found to be in conflict.

Sustained Yield

A key to the success with uneven aged silviculture is to constantly acquire regeneration of the desired species after each cutting cycle. Success means both adequate numbers and adequate distribution. Adequate numbers of seedlings and saplings must be acquired, so that they can develop into saplings and subsequently into the merchantable classes.

Sub-merchantable stand development drives the long-term sustainable yields for the stand.

By harvesting less than the incremental growth, releasing young poles and saplings and maintaining proper spacing, sustainable harvest levels can be maintained. A permanent, non-diminishing inventory of 100 MMBF will be maintained with an average annual growth rate of approximately 1.5%.

1. (S) Regardless of how the individual units are harvested, the allowable harvest for any particular 10-year period will not exceed growth on the entire timber base. So that harvests remain flexible, any one unit may experience more intensive cutting than another unit during the planning period of this Plan.

Rotation

Conflicts will be minimized or avoided through the application of the following standards and guidelines and through continuous resource monitoring. Standards and guidelines include specific prescriptions and practices used to protect, maintain and enhance forest productivity and future timber supplies over the long term. They have been adopted and developed through time to manage the City of Arcata timber resources in an efficient manner and simultaneously meet the stated goals and objectives of this management plan.

Longer rotation ages result in larger and fewer trees harvested per acre. There is less un-merchantable slash debris following logging operations as compared to younger harvested stands with more un-merchantable sized tops. The need for site preparation is lessened by the lower volumes of slash material. Also larger and fewer logs are handled (skidded, loaded and scaled) during harvest, resulting in lower overall operating costs.

2. (G) Regenerating stands harvested using the group selection method may be commercially thinned at 35-55 years to increase growth and to reduce stem density.

2. Timber Management Controls (volume regulation)

Carrying out the timber management portion of this Plan requires maintaining control over volume and area to achieve acceptable yields during the planning period.

Regulation is defined as the manipulation of the forest stands so that they contain a proper proportion of young, intermediate and mature trees to produce a continuous and sustainable production of timber. Regulation minimizes the risk of overcutting during any single cutting cycle, and ensures operable volumes in subsequent cutting cycles.

For regulation purposes, both the Jacoby Creek Tract, Sunny Brae Tract and the Arcata Community Forest Tract are considered together as one unit. The regulation of cut is decided by the previous periodic growth.Since the portions of the Community and Jacoby Creek Tracts have been harvested under even-age and uneven aged silviculture in the past, a combination of volume control and area control will be used to regulate the harvest during the next planning period of 10-20 years.

3. (S) Within any five-year period the volume of timber harvested should be less than or equal to the growth on both forests. This means that scheduled volume harvested from the forests during a particular year may fluctuate, but the five-year cut must reflect the average annual allowable harvest. The immediate objective over the next decade is to cut less timber volume than grows during that period.

4. (G) The regulation of harvest is set in this plan for the next planning period but can be amended any time due to:

a. changes in the Forest Practices Rules
b. growth/inventory updates
c. changes in the timber base acreage
d. when cumulative watershed effects indicate a need for management modifications.
e. Influence of listed species status
f. Major forest disturbance from fire or storms

5. (G) Forest inventories shall be kept up to date by re-measuring inventory plots every ten-fifteen years.

Silvicultural Systems

A range of silvicultural systems will be used depending on the specific site conditions. Methods may include group selection, individual tree selection and commercial thinning.

The combination of silvicultural methods used will combine to create an uneven age effect on the forest stands as a whole while retaining a significant amount of older mature forest types. The group selection harvested areas will be more even-aged in structure although some larger trees will be retained in these areas.

Timber Harvest

6. (S) Residual old growth trees shall not be harvested or damaged during logging operations and have been removed from the allowable cut analysis.
7. (S) The City shall maintain updated archaeological survey information on the entire forest and ensure that timber harvest activities do no impact archeological resources.

8. (S) Cable and tractor yarding methods will continue to be used on both forests. To reduce damage, the smallest yarding equipment that will do the job satisfactorily will be selected. Tethered logging systems mays also be used on steeper ground as site conditions allow and environmental impacts are minimized.

9. (S) Forest opening created by group selection harvests shall be shaped to visually blend in with the natural terrain and shall not exceed 2.5 acres. In addition, patches shall be laid out to minimize breakage and the potential for wind throw.

10. (S) Within each cutting area, every effort shall be made to leave snags, hardwood and down logs intact. In addition, any existing residual old growth trees encountered shall be left intact to provide late seral stage characteristics and variation in the canopy. Old growth trees have been inventoried and their locations mapped.

11. (G) Trees will not be felled across a Class I, III watercourse.

12. (S) Timber operators must fall trees so that stump height is less than 12" to minimize waste and increase the wind firmness of the future dominant sprouts.

13. (S) Equipment shall be excluded from watercourse protection zones except at designated stream crossings or where the use of existing skid trails within the watercourse protection zone would be less disruptive than construction of new trails outside the watercourse protection zone.

14. (G) Timber harvesting activities within a Class I, II and III watercourse shall follow the Forest Practice Rules at a minimum. Currently the NTMP required a 100’ no-cut zone adjacent to Class I watercourses and a 75” no-cut zone adjacent to Class II watercourses. Deviation from this standard can only occur when a stated ecological objective is described. For example to thin a very dense stand to increases growth and light penetration for aquatic habitat benefits. The City requires at least 25% of the pre-harvest canopy be maintained within 25 feet or first break in slope whichever is greater, adjacent to Class III streams.

15. (G) The use of boom type grapple log loaders has been required in all logging operations since 1985 and this requirement will continue. Due to the desire for keeping landings as small as possible, front end log loaders are not practical in City timber harvest operations except when large landing are already present.

16. (S) Trees will be left within the inner gorge or channel zone to provide late seral stage habitat and connectivity.

17. (S) Winter season logging shall only be allowed on a limited basis and is subject to the following:

- shall only occur after extended periods of dry weather and never under saturated soil conditions.
- shall be limited to yarding from (via long-line) all season roads. In all other areas timber falling is the only activity allowed after November 15th.
- erosion control structures shall be installed on all skid trails and tractor roads before the end of the day if the U.S. Weather Service forecast is a "chance" 30% or more of rain before the next day, and prior to weekend or other shutdown periods.
- shall not take place within any watercourse protection zones or areas or poor drainage.

- log hauling shall cease when weight from equipment results in road deformation.

18. (S) All existing down logs shall be left on the site. When levels of coarse woody debris fall below five tons/acre, or below optimum levels determined by the Forest Advisory Committee, material will be recruited over time or hauled into the forest when material is available from other sources.

19. (S) Snags shall be left unless they are deemed a hazard to the timber operator or the public. Such snags shall be marked by the RPF and left on site after felling.

20. (S) The hardwood component shall be maintained by retaining individual hardwood and riparian trees.

21. (S) On soils identified as having a potential for mass-wasting, harvesting activities and road work will be designed to reduce the risk.

22. (G) Prevent tractor logging on slopes greater than 40 % - unless on-site factors allow for a deviation from this standard without adverse risk to soil resources. For example when a stable mid-slope bench allows for long-lining capability by tractor.

23. (G) Within group selection areas 8 - 10 co-dominant to dominant sized green trees of mixed species composition will be left per acre. These leave trees may be arranged in clumps or irregularly spaced. This will include some areas where the ground is undisturbed by logging equipment or burning.

24. (G) Leave all smaller un-merchantable trees < 10" DBH unless damaged by logging operations or where they would be highly susceptible to windfall.

25. (G) Retained green trees should be wind firm and have high diameter-to-height ratios and large crowns to increase post-release growth.

26. (G) Distances between group selection units will be sufficient to provide wildlife cover and provide for economical future harvest units. Generally, distances are equivalent to 1.5 tree lengths.

27. (G) Landing size shall be kept to the absolute minimum size with the roads shoulder's used as landings whenever possible.

28. (G) Temporary roads will be closed and deactivated upon completion of timber operations.

30. (G) In units where mechanical soil compaction exceeds City standards in the opinion of the Arcata Forest Management Committee members and the City Forester, machine ripping of compacted skid trails will be required to provide a suitable rooting medium for planting stock.

31. (G) Trucks leaving the Community Forest tract via the Fickle Hill Road shall not haul logs earlier than 7:00 a.m. The northern haul route via the Samuel's Conservation easement that intersects with West End Road should be used as the primary log haling route for the ACF Tract. Log hauling via the Samuels road may occur at 6 a.m.

32. (G) Emphasize maximum skid road spacing in timber harvest plans and assure that they are flagged by the RPF before operations. Efforts shall be made to use previous or existing skid trails as much as possible.

33. (G) Roads shall be watered during summer months when necessary to reduce dust impacts.

34. (G) Road or trail closures will be implemented when logging activity poses a hazard to recreational

users. Signs will be installed warning forest visitors of the potential hazards.

35. (G) The success of any harvest operation depends on adequate supervision and quality control of the Licensed Timber Operator. The RPF or supervised designee should visit the logging operation on a daily basis to assure compliance with the standards and goals of this plan.

36. (G) Make regular assessments of hazard tree potential in areas of high use and along the urban interface. Remove hazard trees based upon these assessments.

Reforestation and Site Preparation

Natural regeneration is to be encouraged but is not expected to be sufficient to satisfactorily restock harvested stands. Therefore, units will be hand planted to meet stocking standards as set by the State Forest Practice Act.

37. (S) Seedlings planted on harvested sites will reflect the existing tree species diversity. In areas of the Community Forest where most of the whitewoods were selectively cut during the 1960's, the species mix re-planted should reflect the expected natural diversity of conifer species found in the un-thinned areas of the Community Forest such as the stand just east of Redwood Park. Special consideration shall be given to regenerating western red cedar and western hemlock as viable components of future stands in the Community Forest.

38. (S) All harvested areas shall be re-planted the first year after harvest and all units shall be stocked within three years of the harvest date.

39. (S) Logging slash will be lopped to approximately 24" of the ground surface and tractor crushing of slash material shall not be permitted.

40. (S) Accumulations of slash at landings, along roads and within 100 feet of residences shall be machine piled and burned or chipped or removed.

Timber Stand Improvement

The health and vigor of trees will be improved where vegetation competition substantially inhibits tree survival and growth.

41. (S) Stands shall be pre-commercially thinned to maintain or increase growth, to produce the desired species mix, and to eliminate poor growing trees before the first commercial entry. Pre-commercial thinning in regenerated group selection stands will occur when the stands are 8 – 10 years old and less than eight inches in diameter.

42. (S) During the first pre-commercial thinning, seedlings and saplings which are significantly impaired by competing vegetation will receive release treatment concurrent to the thinning operation. The principal brush species that compete with conifers are alder in the Community Forest Tract and cenanothus in the Jacoby Creek Tract. Herbicides shall not be used for vegetation management. "Significantly impaired" is based on the judgment of the City forester but generally means if the trees are showing signs of poor leader growth in areas where shrub cover exceeds 40% of the site.

43. (G) Local seed sources will be used for reforestation, and should be planted on a 10' x 10 spacing arrangement. The local seed zone is 091.

44. (G) Forest boundary lines shall be brushed, blazed and otherwise maintained so that the property

lines are clearly delineated. City staff shall be diligent in identifying and resolving trespass issues.

45. (G) Explore the potential for the issuance of permits for the collection of other vegetation such as mushrooms, ferns or greenery on a commercial basis by the City or by the public. Cultural use of native plants within the ACF shall be allowed with a Nature Area Use Permit.

Fire and Fuels

46. (S) Prescribed burns shall be conducted under safe conditions and when there is a fire break, natural or manmade to contain escapes.

47. (G) Fire wood gathering by the public will be allowed on a permit basis for qualifying nonprofit groups. Due to liability concerns the forests shall not be open to the public for fuel wood cutting following timber harvests.

48. (S) All wildfires occurring in the forests shall be controlled as soon as possible. There are no "let bum" areas on the City Forests.

49. (S) Harvest operation closures shall be carried out as required by the local fire weather conditions. Other prevention activities shall include signing for recreational users during high-use and high fire danger periods.

50. (G) Broadcast burns to reduce slash shall area harvest methods will be limited to selection, single tree selection and salvage with the goal of maintaining a visual buffer strip of large diameter trees. In this area extreme care must be exercised when selecting trees to leave in this zone based on wind firmness. Routine checks for hazard trees shall be conducted along the urban interface.

51. (G) Accumulations of slash at landing sites shall be spread out as mulch or machine piled following harvest and burned during the winter period (November-April).

52. (G) Pre-harvest understory burns shall be allowed in areas of heavy fuel loading to reduce the eventual slash accumulations generated during future harvests.

53. (S) Maintain a development setback of 150’ for new structures adjacent to the ACF for public safety and to minimize burdens to city forest slash treatment requirements in the 100’ -200’ “fire protection zone..

Hardwoods

54. (S) Hardwood stumps are to be cut as low as possible to encourage basal sprouting.

55. (G) Protect the integrity of all hardwood stands.

56. (G) Cutting or girdling of hardwood is permitted to improve conifer growth when consistent with wildlife habitat objectives.

OPPORTUNITIES

There is an opportunity to collect conifer seed from the City timber for future seedlings propagation. Seed could be stored for several years until needed.

Using the new Lidar imaging and mapping skid trails can be more easily mapped on all tracts.

There are opportunities to expand the research and education potential on the City forests.

The Forest Vegetation Simulator (FVS) is a federally supported forest growth simulation model. It simulates forest vegetation change in response to natural succession, disturbances, and management. It is expected that this model will have a redwood variant and be available for the city to use in 2021. The City currently use the FORSEE (Forest and Stand Evaluation Environment) system for inventory and growth modelling. Comparing and contrasting these two systems in the ACF would be a good research project.

A cooperative management strategy with Humboldt State University could be developed covering the upper Jacoby Creek Tract and the HSU forest consistent with the state and federal grant applications that enabled the 2019 967 acre Jacoby Creek headwater RH Emmerson acquisitions..

As the City approaches the 2,500 acre limit for the NTMP consider migration to anther uneven age permitting option such as a working Forest Management Plan (WFMP).

Continue to work with area landowners, tribes, conservation groups and other local government agencies to secure conservation easements and or fee title acquisitions to buffer the community forest lands, improve access and maintain forest habitat adjacent and near to the city's forest holdings.

Provide timely input to the County of Humboldt regarding forest polices, general plan polies and development projects that may affect the ACF. One specific polity the City should work to limit the distance of residential development adjacent to the ACF to prevent extra forest management costs to the city for extra slash treatment requirements in the "fire protection zone".

WATERSHED RESOURCE MANAGEMENT

POLICIES

Water quality, soil, riparian and aquatic biological productivity shall be maintained and enhanced through the application of City forest management standards and implementation of watershed improvement projects.

CURRENT SITUATION

Both the Community Forest Tract and Jacoby Creek Tract were initially acquired for watershed and water supply purposes in 1904 and 1942 respectively. Only the Community Forest Tract was used for that purpose. A proposed dam was never constructed in Jacoby Creek as a new water source was secured on the Mad River in 1964. Presently City forests comprise an important upper watershed area of fish bearing streams that flow through urban areas and eventually into Humboldt Bay.

Water Quality

Community Forest (ACF and SBF Tracts)

Three primary watersheds drain the Community Forest Tract They are the Janes, Jolly Giant and Campbell Creeks. These creeks were heavily impacted by the clear-cut logging during the early part of this century and have been in a period of slow recovery since then. An additional three small unnamed tributaries drain to Warren Creek and Leggit creeks which drain into the Mad River. The Sunnybrae Tract includes Beith and Grotzman Creeks both of which drain through urban parts of Arcata before flowing the Humboldt Bay via the Jacoby Creek/Gannon Slough Wildlife Area. There are several known domestic water sources located on or adjacent to the ACF and SBF tracts

The Community Forest Tract has 0.27 miles of class I watercourse, 6.4 miles of class II watercourses and

2.5 miles of class III watercourses. The Sunnybrae tract contains 0.17 miles of class I watercourse,3.8 miles of class II watercourses and 1.3 miles of class III watercourses.
Community Forest stream channels were used as oxen skid trails during the initial logging of the old growth timber. Logs were yarded into the stream channels during that time causing major hydrologic disruption and introducing sediment into the system. Many reaches of streams were actually filled with soil and woody debris.

Based on observations of all of the watercourses within the City forests, impacts from forest management activities during the past ten years have not combined to produce any significant adverse cumulative watershed effects. Watercourses on both forests however, are still not in optimal condition due to impacts from logging activities long ago. Those activities 80 - 100 years ago are responsible for much of the degraded channel conditions visible today.

In Janes Creek the channel is severely obstructed with debris throughout much of its length in the Community Forest. In some locations Janes Creek flows under the ground surface. Rehabilitation efforts have "day lighted" some of the worst sections that during high flows caused vertical stream banks to cave in. Much of the existing debris is very large and the stream has reached a quasi-state of equilibrium. Careful consideration must be given to any future channel clearing projects as the long term benefits of such action may not be outweighed by the short term sediment inputs that would be incurred from such channel clearing.

Two remnant dams are located on Jolly Giant Creek. The lower dam has been breached and has been stabilized. The much larger upper dam has been inactive since the early 1960's and constitutes a channel obstruction. Before that time the reservoir provided municipal water to Arcata. During heavy precipitation events. Ponding occurs behind the dam as the drain from the dam is only 12" in diameter. The larger dam has been retrofitted to accommodate a 500- year storm event. The retrofit includes trapezoidal concrete lined spillway and a 30” drain pipe on the north side. A small remnant dam also exists on Campbell Creek in the vicinity of Redwood Park. This dam has been breached and is now vegetated and stabilized.

Recent past, management activities have included road construction road decommissioning and tractor and cable logging operations utilizing group selection cutting systems. The road system is generally in good repair with rocked and outsloped road surfaces and hydrologically disconnected from watercourses. The Jacoby Creek tract has some landsides that periodically move and damage the road prism. Generally roads conform to the contours of the landscape which minimizes the amount of cut and fill. The forest management road network has been completed and little if any new construction is anticipated. Periodically temporary roads may be reopened to provide equipment access.

Jacoby Creek Tact

The Jacoby Creek Tract represents 25% of the total Jacoby Creek basin area. Because of the complexity of ownerships, extensive areas of unstable soils, miles of poorly maintained and abandoned roads on adjacent ownerships, and the relatively high rate of timber harvesting during the past 70 years, the Jacoby Creek watershed represents a disturbed but recovering system.

Jacoby Creek (a class I stream) flows through the City property for 3 miles in an east to west direction. There are 10.7 miles of class II and 7.2 miles of class III watercourses draining the Jacoby Creek Tract and feed directly into Jacoby Creek. There is no domestic water usage within in the Jacoby Creek Forest. However, there are several domestic water intakes in the lower Jacoby Creek Forest.

The southwest side of the JCF hosts several residual old growth trees including redwood, western red cedar, western hemlock and Douglas-fir. Maintenance of water quality is currently mandated through application of the State certified and Environmental Protection Agency (EPA) approved Best Management

Practices (BMPs) for controlling non-point sources of pollution to surface waters. During the timber harvest plan review process, all proposed management activities must be approved by the California Department of Fish and Wildlife, the Regional Water Quality Control Board and the California Department of Forestry and Fire Protection personnel. Each Notice of Timber Operations filed by the City requires and Erosion Control Plan (ECP) that describes measures to address existing treatable erosion sites as well as other road upgrades measures to insure that post-harvest, watercourses are not impacted by suspended sediment.

The road system is completed and no new construction is anticipated. Currently 4.4 acres are dedicated to the permanent road system. An additional one to two acres are used as landing areas on an ongoing basis. This represents 1.0% of the land base on the Jacoby Creek Forest.

The Jacoby Creek tract road system includes one 55- foot flatcar bridge and 12 permanent culverted stream crossings.

Soils

Soil is a fundamental and essential forest resource that directly influences all other resources. The individual characteristics of each soil type determine potential for erosion following disturbances such as road construction and timber harvesting. Soils were classified and mapped in 1960 by J. De Lapp and E. Alexander.

Jacoby Creek Tract

The Jacoby Creek tract soil types include the Melbourne, Atwell, Hugo and Boomer series. (Appendix A). These soils were formed by weathering rocks of the Central Belt Franciscan Complex. This highly deformed "melange" unit contains a wide variety of well lithified, isolated blocks of resistant rock types enclosed in a matrix of pervasively sheared and pulverized shales, siltstones and sandstones. Timber production on all of these soil types is rated as moderate to very high. The Atwell soil series underlies a large portion of the Jacoby Creek Forest and poses special management problems as it is unstable and subject to failures via earthflow and translational slides. The soil has a high surface erosion hazard rating. A few areas are underlain by shallow colluvial soils that are subject to episodic debris slides if hillslopes are undercut by road construction, or if steeper slopes are harvested. These areas present special management considerations. The remainder of the Jacoby Creek Forest has a moderate to high surface erosion hazard rating primarily because of the steep slopes.

The Boomer soil series has developed on much younger rocks of the Falor Formation. The Falor consists of poorly lithified and only slightly deformed alternating sequences of sands, silts and gravels formerly deposited in near shore marine, bay and fluvial settings. These soils have high to very high timber growth potential, and moderate to high surface erosion hazard ratings.

Community Forest and Sunnybrae Tracts

The Community Forest tract four soil types. They are the Larabee, Mendocino, Empire and Rely series. Approximately 90% of the forest is covered by the Empire and Rely soils. They are both rated as high to very high for timber growth potential but also have a high erosion hazard rating especially on slopes of more than 30%. These soil types are derived from weathering sediments of the Falor Formation.

The Larabee and Mendocino soils comprise the other 10% of the Community Forest. Both have high to very high timber production potential and the erosion hazard is moderate. These soil types have formed by weathering the above discussed Franciscan Complex rocks.

Current management has focused on reducing soil compaction and maintaining the nutrient balance.

Management practices include low intensity (if any) fires to limit nutrient loss, the maintenance of ground cover to reduce soil erosion and limiting heavy equipment use on moist soils to prevent soil compaction.

Presently surface soil loss monitoring is limited to visual observation. Based on these observations, surface erosion is a minor component of potential erosion. Evidence of surface erosion is found on areas of trail shortcuts.

The results of compaction can be seen in the Community Forest because of extensive skid trail development during logging activities in the mid to late 1960's. Areas of poorly growing conifers line skid trails and landings used during that period.

More recent and current forest management practices have prescribed equipment limitations and also excluded winter operations. In addition, attempts have been made to break up compacted ground such as skid trails and landings.

Organic Matter Loss

Organic matter loss occurs primarily due to site preparation activities such as high temperature controlled burns, and by the scraping and compacting action associated with heavy equipment operation on skid trails and landings.

Organic matter loss will be minimal. No broadcast burning is planned. Burning will be limited to machine piled landing fires. In these locations, organic material will be consumed. The use of previously used skid trails should limit the displacement of organic matter to less than 15% of the plan area. Slash material will be lopped and scattered on site to provide slow decomposition into the soil.

Soil Compaction

Soil compaction occurs primarily during timber yarding operations. Areas where soil compaction losses can occur include skid trails, landings and roads where heavy crawler tractors and rubber tire equipment are used. Soil compaction results in increased surface runoff by decreasing the infiltration rate. Soil compaction potential increases with the size of the logging machinery and when skidding on wet or saturated soil.

Limiting skidding to existing skid trails will minimize soil compaction. All landings and selected skid trails shall be ripped to a depth of 18"-24" following harvest operations to break up compacted areas. Landings shall be kept to a minimum size and no new landings are necessary for the long-term implementation of this FMP. The City shall also work with PG&E to insure that their power line vegetation maintenance does not occur within the winter period and adheres to all applicable BMP’s required.

Current management has focused on reducing soil compaction and maintaining the nutrient balance. Management practices include low intensity (if any) fires to limit nutrient loss, the maintenance of ground cover to reduce soil erosion and limiting heavy equipment use on moist soils to prevent soil compaction.

Growing Space Loss

The amount of productive forest area lost to other uses in Arcata's forests is low when compared to other forest ownerships managed under intensive forest management programs, and is well below threshold levels established by the U;S. Forest Service on local federal timberland. The Forest Service uses the "equivalent roaded area" concept to determine the threshold of concern. Then more then 10-12% of a watershed (8% in more sensitive areas) is comprised of "equivalent roaded area" the threshold of concern is reached. The City forest road systems represent 1-2% of the forest land base (Barnes, 1994).

Sediment Production and Yield

Sediment production has not been quantified except by direct observations. There have been some periods of sediment sampling in the past by HSU and other agencies, but the data sets are not reliable enough for City forest planning purposes. In the urban portion of Arcata, creeks appear to be aggrading. The filling of channels is occurring in areas of low channel gradient downstream from the Community Forest. Based upon current observations, both past forest management and urbanization has contributed to this increased sedimentation.

Jolly Giant Dam acts as a sediment trap and there is evidence that a large quantity of sand and silt has been deposited behind the dam. Problem areas include trails (official and unofficial) which are located near streams; failed road and skid trail drainage structures; and small-scale stream bank landslides.

Many studies have shown forest roads to be the primary contributors of sediment to streams (Swanson and Dyrness, 1975; Reid and Dunne, 1984; Weaver et. al, 1987). Sediment contribution per unit area from roads is usually much greater than from all other land management activities combined (Gibbons and Salo, 1973).

As recreational use has increased in the Redwood Park vicinity, so has the proliferation of shortcuts and illegal hiking trails. Compaction and obliteration of understory vegetation have reached the point where sedimentation from sheet erosion is causing moderate increases from natural background levels. This is especially a problem in the Campbell Creek drainage east of Redwood Park.

Until recently, the poor condition of the old Jacoby Creek road was the principal problem within the Jacoby Creek Tract. The road had several rotten culverts, had washed out in a couple of locations and was poised for failure in several others. The City secured cost-share funding for major rehabilitation of this road in 1993. This rehabilitation project builds on the historical efforts by the City and others during the past fifteen years to remedy many of the most serious problems within the watershed.

Since mass movement (landsliding) provides a major risk of sediment input to forest streams, roads and harvest units have been planned to avoid high risk sites. In the Jacoby Creek tract, steep slopes in the inner gorge area (directly above Jacoby Creek where the hillslopes are greater than 65%) can be susceptible to shallow debris slides or debris avalanches if slopes are loaded with sidecast material from road bench construction; if the hillslopes are logged, by the concentration of surface water and by altering subsurface drainage patterns thru compaction. Within all forest tracts both forests, formerly active deep-seated rotational failures could become problems again if not taken into careful consideration when planning skid trails, roads and landings. Currently there are no significant active landslides causing adverse sedimentation problems in either forest.

Aquatic Biological Resources: Fisheries Community Forest

Within the Community Forest boundary, only Jolly Giant Creek has sufficient habitat to support a fish population. The fish present are a remnant population of coastal cutthroat trout *(Oncorhynchus clarki).* These fish occupy a one-half mile section of stream between the darn and the culvert under the Humboldt State University (HSU) dormitory complex. The population is a resident remnant of a formerly anadromous population that existed prior to establishment of migration barriers resulting from freeway and urban development. This population is a genetically important population of native Humboldt Bay cutthroat trout. The SBF Tract contains a short segment of Beith Creek that has costal cutthroat trout present.

All of the creeks draining from the Community Forest support salmonids in their lower reaches and Jolly Giant Creek and Jacoby Creek also sustain breeding populations of coastal cutthroat trout and rainbow trout within the Forest boundaries (see Roelofs, 1993, Student Field Reports and Census Data).

Jacoby Creek Tract

Jacoby Creek is a major tributary to Humboldt Bay and supports anadrornous populations of coho salmon *(Oncorhynchus kisutch),* steelhead *(0. mykiss)* and coastal cutthroat trout. Other fishes present are three spined stickleback *(Gasterosteus aculeatus),* Pacific lamprey *(Entosphenus tridentatus)* and sculpin *(Cottus sp.).*

A waterfall located on City lands near the old Jacoby Creek rock quarry prevents the migration of anadromous fish. Resident rainbow and cutthroat trout inhabit the reach above the falls. This reach is not open to the public for fishing.

The healthy riparian zone along Jacoby Creek is largely responsible for the high quality stream habitat that exhibits abundant woody structure, frequent pools, and a dense vegetative canopy. None of the several tributaries (class II and class III) draining from the Jacoby Creek Forest have sufficient flow to support fish. These smaller streams are important contributors of cool water and nutrient rich, vegetative litter to Jacoby Creek.

The primary limiting factor to salmonid production in the Jacoby Creek watershed is most likely fine sediment (Lisle, 1985). Fine sediment impacts spawning gravel by reducing egg survival and restricting emergence of the fry from the gravel. In addition, heavy sedimentation following spawning can kill all the eggs by blanketing the nest. Excess sediment also reduces the living space for aquatic insects, thereby reducing the food supply for fish and amphibians (MacDonald, et al. 1991).

Other Aquatic Habitats

In addition to watercourses, limited areas of seeps, springs, closed depressions with ponded water and seasonal wetlands occur within the City forest. Standing water provides habitat for a variety of species including northern red legged frogs *(Rana aurora)* and Pacific giant salamanders *(Dicamtodon copei).*

In the Jacoby Creek tract, shallow bog type wetlands ranging in size from 380 meters (1,240 feet) in diameter typically are surrounded by wet soil tolerant western red cedar. These bogs are used by wildlife and are ideal locations to observe wildlife tracks into the late summer.

In the Community Forest tract, the wetland behind the dam on Jolly Giant Creek provides the most significant seasonal pools on the forests. Other wet areas include springs and seeps. Most of the springs and seeps have been located and mapped.

OBJECTIVES

The City intends to carry out the watershed policy by preventing cumulative watershed effects. Cumulative or adverse watershed effects are the result of interactions between individual land disturbing activities related closely enough by time and location to produce a significant and often larger response. The interaction of impacts can be measured or observed both on-site, where noncumulative individual activities occur, as well as off-site in downslope or downstream areas.

Specifically the objective will be achieved by controlling individual effects on soil productivity, aquatic and riparian resources and water quality caused by timber and recreational management activities.

Within and downslope from the City forestlands, watershed effects produced by timber harvesting and recreational activities can be divided into several categories. These include:

1. soil productivity

2. sediment production and yield
3. watercourse condition and water quality
4. aquatic biological resources

Specific practices used to prevent degradation in these categories are listed under Standards and Guidelines below.

Soil Productivity

Soil productivity is defined as the capacity of the soil to produce vegetation. Productivity is influenced by depth, percent rock fragments, water holding capacity, texture, nutrient status and quality of the duff or organic layer.

I. Soil productivity will be protected and enhanced by:

1. Preventing organic matter loss
Organic matter loss occurs primarily due to site preparation activities such as high temperature controlled burns, and by the scraping and compacting action associated with heavy equipment operation on skid trails and landings.

2. Preventing surface soil loss
Surface soil loss occurs when extensive areas of ground are exposed to rainfall resulting in sheet/rill erosion and gully erosion of the topsoil layer. This is especially a concern on steep slopes, or slopes and roads adjacent to watercourses.

3. Preventing soil compaction
Soil compaction occurs primarily during timber yarding operations. Areas where soil compaction losses can occur include skid trails, landings and roads where heavy crawler tractors and rubber tire equipment are used. Soil compaction results in increased surface runoff by decreasing the infiltration rate. Heavily compacted soil may also be difficult to revegetate. Soil compaction potential increases with the size of the logging machinery and when skidding on wet or saturated soil.

4. Preventing growing space loss
Loss of growing space occurs when forest areas are converted to other uses or rendered incapable of growing trees through site degradation. Areas converted to non-timber growing acres on the City forests are limited to road right-of-ways and some landings.

II. Sediment production and yield will be minimized.

Soil erosion is defined as the detachment and transport of material. Sedimentation is the deposition of that material either on the hillslopes or in adjacent stream channels. Sediment production refers to the rate at which soil erosion occurs, and soil or sediment is redistributed in a drainage basin. Sediment yield refers to that percentage of produced sediment that is actually delivered to stream channels, which can then be transported out of a drainage basin. Both are usually expressed as volume per unit area per unit of time.

Erosional processes in order of relative importance on City forests are mass wasting (landslides); fluvial (gully and rill) erosion and surface soil loss. Land use activities such as road building, timber harvesting and urbanization tend to accelerate erosional processes and sediment yield. Areas of exposed bare mineral soil because of timber harvest and road construction are unavoidable.

Through prudent management techniques, utilizing stringent erosion control practices and the standards contained in this Forest Plan, sediment production will be minimized or even reduced from existing levels

in the future. Every Notice of Timber Operations requires the implementation of an Erosion Control Plan (ECP). The ECP's are submitted to CAL FIRE and the Regional Water Quality Control Board for each harvest entry.

III. Maintain and/or improve current condition of watercourses and water quality

Good water quality is essential for growth, survival, reproduction and migration of individuals within the aquatic community. Degradation of watercourses or watercourse condition and water quality occurs because of removal of riparian vegetation, urban influences, heavy equipment (i.e. leaking fluid from logging equipment), industrial pollution, accelerated sediment input associated with management activities, and the extraction of water from forest streams for other uses.

Specific standards and guidelines have been developed to protect, maintain and improve existing watercourse conditions and water quality. These are listed in a separate section below.

IV. Maintain and/or improve current aquatic biological resources

A healthy stream has a large variety of organisms. Indicators of healthy aquatic biological quality include fish, amphibians, such as Pacific giant salamanders, macro invertebrates, such as insects and crustaceans, and certain rooted aquatic vegetation and algae.

Three factors are critical in maintaining the aquatic habitat in Arcata's forest streams and wetlands.

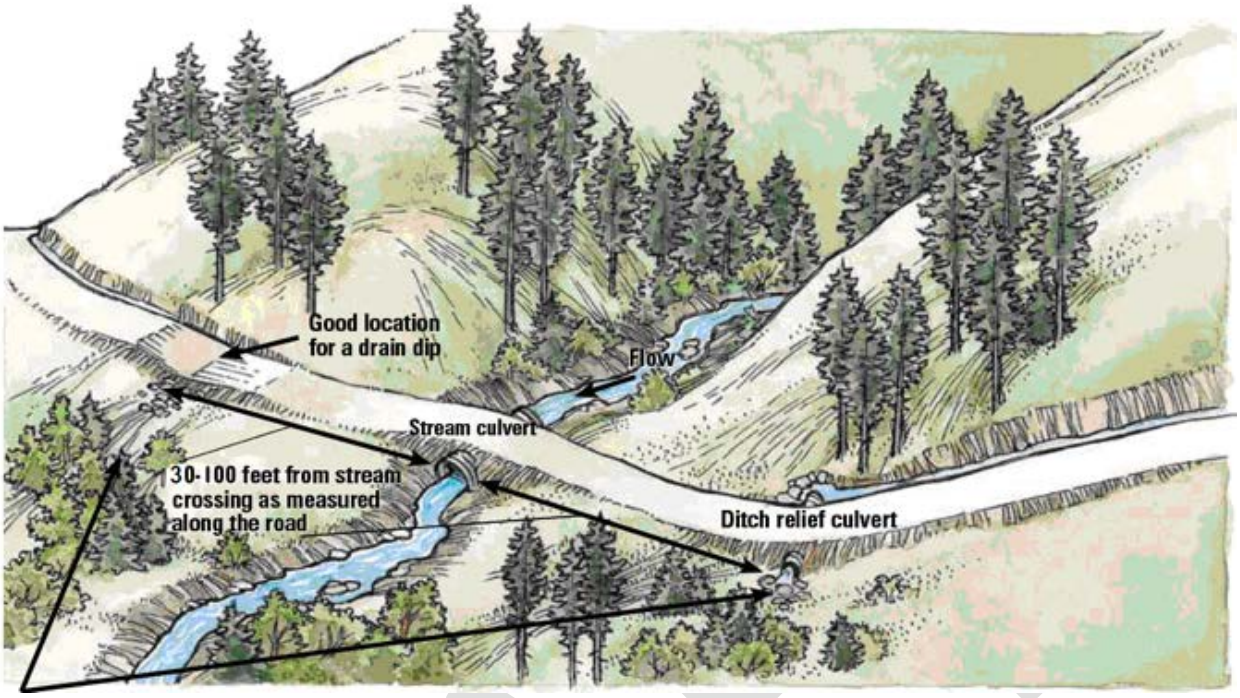
The first is retention of the forest canopy bordering the streams and wetlands that directly provide the vegetative matter that is the base of the aquatic food chain. The streamside canopy also shades watercourses and thus prevents increases in water temperature. High water temperatures (with less dissolved oxygen) tend to increase the metabolic rate of cold water organisms causing increased stress.

The second factor is to maintain complex structure in streams and wetlands through the contribution of large wood debris. As streamside trees die they often fall into or adjacent to the channel creating complex stream and riparian pool habitats.

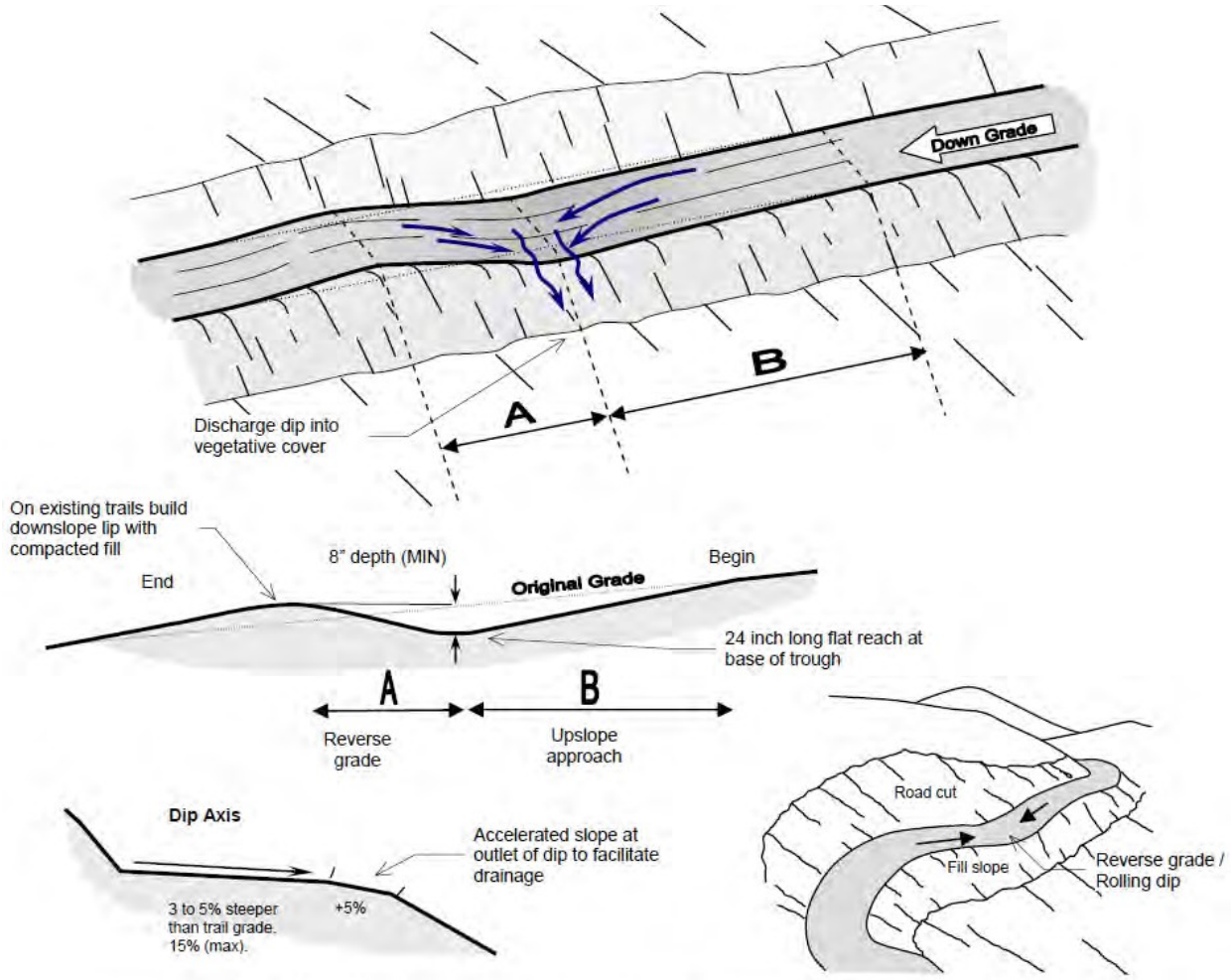
The third factor is limiting the input of sediment to stream channels. Excess fine sediment can impact salmonids through degradation of spawning gravel and reduction of aquatic food production. Larger particles such as gravel, cobbles and boulders are important elements of high quality fish habitat.

Management efforts will attempt to maintain and improve the current diversity of the aquatic community.

In the future, the City forests should not experience an increase in problems from cumulative watershed impacts. Prudent scheduling of activities and implementation of watershed improvement or mitigation projects will help maintain all watersheds within the forests below significant impact threshold.



Ditch drainage should be directed into vegetation and undisturbed soil filter, and not allowed to continue flowing down the ditch and into the stream.



ROAD GRADE (%)	TROUGH	A: REVERSE GRADE	B: UPSLOPE APPROACH	
	Depth below downslope crest	Distance and grade from trough axis to downroad crest (ft)	Distance from up-road start of rolling dip to trough axis (ft)	Grade (%)
<5%	8"	7 feet at 10% to 15 feet at 5%	17	10%
10%			30	15%
15%			60	20%
>15%		7 feet at 10%	60	25%

Graphic illustrating hydrologic disconnection and rolling dips to be employed on road system.

STANDARDS AND GUIDELINES

Standards and Guidelines address the potential concerns discussed above. These standards and guidelines provide for the protection, maintenance and enhancement of soil productivity, aquatic and riparian resources and water quality.

Soil Productivity

1. (S) Landings and temporary roads will be closed following logging operations. This includes removal of culverts, out sloping, water barring and revegetation of fills.

2. (S) Avoid the use of soil disturbing equipment on wet or poorly drained soils.

3. (S) Retain large woody debris, logs and slash material within harvest areas for future nutrient cycling.

4. (S) Logging slash shall not be crushed with tractors for site preparation to limit compaction.

5. (S) Growing space loss is kept to a minimum by: using small landings which are ripped and reforested; keeping road widths to a minimum and ripping; and replanting temporary roads.

6. (G) Avoid intense high temperature fires to prevent loss of soil productivity and to prevent sediment, ash, and nutrients from entering watercourses

Sediment Production and Yield

7. (S) Armor the area at culverted outfalls.

8. (S) Avoid creating berms that hinder drainage on low gradient roads.

9. (S) Relocate existing roads, trails or landings outside riparian areas where necessary to eliminate unacceptable deterioration of riparian dependent resources.

10. (S) Road fills will be free of organic woody or vegetative material. Logs, slash and other organic debris may not be buried within road fills.

11. (S) All major skid trails shall be flagged in advance of operations by or under the direct supervision of the RPF.

12. (S) Temporary crossings involving fill on Class I and perennial Class II watercourses will be installed after May 1st and removed by October 15th. Temporary crossings involving fill will only use clean, washed rock in the watercourse channel (utilizing the CDFW Streambed Alteration Permit). When temporary crossings are removed, the channel will be restored to the approximate original configuration.

13. (S) Watercourse crossings will be designed to accommodate a 100-year runoff event. Appropriate sizing techniques include USGS regional regression equations, the rational method, and flow frequency analysis.

14. (S) Construction of tree layouts (creation of earth fill cushions to fall trees onto) shall be avoided.

15. (S) Road construction shall avoid crossing unstable areas and headwalls (the fan shaped uppermost portions of drainages).

16. (S) Armor both upstream and downstream from each road or trail crossing that has neither a bridge

nor a culvert.

17. (S) Establish and maintain native vegetation on fill material at crossings and below road cuts.

18. (S) Prevent accumulations of logging slash material in watercourses and draws.

19. (G) Roads should be narrow and conform to the terrain as much as possible, avoiding all potentially unstable slopes.

20. (G) Maintenance of *all* drainage structures including water bars, stream crossings, cross road drains and rolling dips shall continue on an annual basis. Vehicular access will be limited to light duty trucks on rocked roads during the winter period.

21. (G) In any location of new road construction where there is a chance that sidecast material could travel down steep slopes to a watercourse, the material shall be end-hauled to a stable location.

22. (G) Monitor adjacent private land use activities for possible impacts to the City's watershed resources. This includes City staff review of Timber Harvest Plans on adjacent land and subdivision plans in the City limits and the unincorporated county area.

23. (G) Retain professional geotechnical expertise to help with assessment prior to expanding the road system.

Watercourse Conditions

24. (S) All permanent and temporary roads and trails shall be out-sloped and outside berms that hinder drainage on low gradient roads shall be avoided.

25. (G) Return all areas in declining watershed condition to equilibrium.

Water Quality

26. (S) Equipment staging areas are prohibited in streamside zones and all equipment and fuels shall be parked or placed outside riparian areas.

27. (S) All known wet areas and wetlands on Arcata's forests shall be protected from degradation.

28. (S) Pesticides and herbicides are prohibited.

Aquatic Biological Resources

29. (S) Those portions of streams containing, or which historically contained, native coastal cutthroat trout shall be managed so that viable populations are maintained.

30. (S) Prevent measurable adverse changes in water temperature, chemistry, sedimentation rate and channel blockage.

31. (S) Prohibit stream modifying construction activities (including restoration work) within or immediately next to the aquatic zone during the spawning seasons for resident cutthroat trout.

32. (S) Equipment is excluded from riparian areas, wetland areas such as wet meadows and springs except at designated stream crossings, or in the course of restoration work.

33. (S) Skidding of logs across streams and wetlands such as wet meadows and springs is prohibited.

34. (S) During culvert and bridge construction, toes of fills will be stabilized above expected levels of high water, crossings will be at right angles, and excavated material placed away from streams.

35. (G) Maintain essential habitat for aquatic organisms.

36. (G) Conduct periodic amphibian and macro invertebrate surveys in stream reaches.

37. (G) Conduct stream channel habitat rating on both forests.

38. (G) Large woody debris that provides habitat for fish shall be maintained through natural recruitment of trees from the adjacent watercourse and lake protection zones (WLPZs).

39. (G) Encourage participation of Humboldt State University in monitoring elements of the watershed resource section.

40. (G) Springs, seeps and seasonal wetlands are important microhabitats for wildlife, and detain stormwater and filter sediments. These areas will be mapped and described in a database as they are found.

41. (G) Coordinate with the California Department of Fish and Wildlife to enhance fish habitat where possible.

Watercourse Condition

There are several locations within the Community Forest tract the creeks flow underground or are significantly obstructed by debris jams deposited in past decades. These locations should be investigated as to the potential of restoring a more natural stream channel configuration to better facilitate stream flow, reduce the potential for channel erosion, and improve habitat.

There is also an opportunity to establish permanent creek cross sections within the forests for long term monitoring of channel conditions.

Water Quality

Opportunities exist for coordination with neighboring landowners within City Forest watershed to conduct erosion control projects with the goal of minimizing cumulative watershed effects including the beneficial uses of water. This process can be coordinated with the City of Arcata Creeks Management Plan. Grants for restoration work such as provided by Section 319 (h) of the Clean Water Act can provide incentives to private landowners and facilitate broad cooperation.

Humboldt State University students could be used to help in measuring baseline stream information such as temperature, biological oxygen demand (BOD) and suspended sediment. This would involve coordination with the University by providing the opportunity for use of the City forests in exchange for data collection.

Biological Resources

Opportunities exist for mitigation of adverse effects on aquatic communities by implementing the silvicultural systems and practices contained within this plan. In general, by employing uneven age systems and leaving down logs, using small landings, avoiding broadcast burns, retaining streamside canopy and limiting harvest intensity, any impacts on runoff timing and stage, as well as impacts on stream organisms should be well within the normal fluctuations that would be expected in these watersheds.

Sampling for the presence of amphibian and stream invertebrates in watercourses would provide useful information on stream condition.

There is an opportunity to obtain updated forest and downstream (below forest boundaries) baseline information on channel condition, water quality, and fish habitat. A system of permanent sampling stations could be installed for long term monitoring.

WILDLIFE RESOURCE MANAGEMENT

POLICIES

Wildlife habitat is managed to promote species diversity and to ensure that populations of indigenous species are maintained. This can best be achieved through the maintenance and enhancement of habitat values. Habitat values which lead to species diversity include the following elements: breeding, foraging, watering, rearing, hiding and thermal cover.

CURRENT SITUATION

Background

The Community Forest provides habitat for a diverse selection of wildlife. This is due to the variety of habitats created through historic and recent management activities and the natural landscape of the forests.

Management activities during the past 30 years fragmented both forests to a degree, thereby increasing habitat for those species associated with open habitats and edges. Species which are deep- forest specialists may have been negatively affected by recent management activities, although some of the effects from patch cutting were offset by retaining larger amounts of structural diversity (e.g. woody debris, green tree retention) on harvested areas.

The forest is in a very dynamic state because of the periodic disturbances. Areas under timber management undergo vegetative succession resulting in a change of wildlife species over time.

Description of Current Conditions

Arcata's forests provide important habitat for invertebrate wildlife species (see Appendix H). Invertebrate species number in the hundreds, and play a pivotal role in the energy dynamics of the forest ecosystem. For example, salamanders prey on insects and other invertebrates, and in turn are prey for mammals, snakes, and birds.

The City Forests are not large enough to effectively manage for forest-interior species that require large areas of habitat for survival. Yet, since some of the habitat and ranges of these species overlap onto the City owned forest land, they must be considered in the planning process. Past efforts have attempted to minimize fragmentation of larger tracts and maintaining the linkage of uncut areas via forested corridors along ridge tops and streams.

The urban influence on the western and southern portion of the Community Forest undoubtedly impacts on the presence and abundance of some wildlife species whereas the Jacoby Creek Forest is located far from town and represents more of a wildland situation. Human intrusion in the form of recreational use of the Community Forest may also impact wildlife use of that area.

The presence of deadwood structures (fallen logs, snags) is a key factor in survival of many animal species such as the Pileated woodpecker and clouded salamanders (e.g., Brown 1985; Harmon, et al., 1986). Thus, species diversity depends on the presence or absence of these deadwood structures in the managed landscape as well as vertical and horizontal spatial complexity.

Snag densities in the Community Forest Tract are low due to past cutting practices and the slow rate of natural recruitment. The current stand has the highest density of snags in the areas that were not selectively harvested during the 1960's and which also support a greater percentage of white wood species such as Sitka spruce, grand fir and Douglas-fir.

Snag densities on the Jacoby Creek Tract are fairly high in areas that have not been recently harvested. The Jacoby Creek tract has an overall higher density of trees per acre and is subject to higher velocity winds which lead to broken off tree tops.

During the next ten to twenty years, the overall acreages of most habitat types are not expected to change very much. However, there may be a shift in the mosaic of habitat areas due to growth of early successional stages and stand management activities such as pre-commercial thinning and timber harvesting.

According to direct observations and the California Department of Fish and Wildlife Natural Diversity Database (NDDB), rare, threatened, or species of special concern documented as occurring on or adjacent to the City Forests include:

- Pacific fisher
- coastal cutthroat trout
- northern spotted owl
- great blue heron
- southern torrent (Olympic) salamander

In addition, several rare, endangered or species of special concern whose ranges may overlap the City forests include:

- bald eagle
- northern goshawk
- Cooper's hawk
- tailed frog·
- marbled murrelet
- golden eagle
- osprey
- Sonoma tree vole
- sharp shinned hawk
- Northern red-legged frog
- great egret
- steelhead trout
- white-footed vole
- Vaux's swift
- western pond turtle
- Foothill yellow-legged frog

Of those species, osprey, Northern red-legged frogs, Olympic salamanders, sharp shinned hawk, Coopers hawk, great blue herons and red tree voles have been observed on City forest land.

Sonoma tree vole *(Arborimus (Phenacomys) longicaudus)* are difficult to locate due to their size and. nocturnal activity, but their nests are readily observed. Tree voles feed on Douglas-fir and grand fir needles eating all but the resin ducts and their nests of twigs are filled with these resin ducts. The remnants can often be found on the forest floor. Sign of Sonoma tree vole have been observed in the Jacoby Creek Forest.

Hardwood Habitat

Except for riparian areas, the only significant hardwood areas are located in the Jacoby Creek Tract. The hardwood component of the south side of Jacoby Creek within the existing reserve zone, is comprised of more than 50% hardwood species. Alder, tanoak, California bay and madrone are the principal hardwood species found in these areas. The abundance of tanoak in this area is important for wildlife. Tanoak is a prolific seed producer which provides food for mammals including Allen's chipmunk, northern flying squirrel and dusky-footed wood rat (Rapheal, 1987). Wood rat nests are noticeable in areas containing hardwoods.

Meadow and Small Opening Habitat

The Jacoby Creek Tract is pocketed by small salal dominated glades of less than one acre in size. These openings contribute to vegetative diversity and are important to many wildlife species by providing forage areas. These areas have been left in a natural condition and have not been converted to conifer sites.

Riparian Corridor and Wet Area Habitat

Riparian habitats present important areas to wildlife on the City's forests. The riparian community provides different vegetation from the forest areas. Certain species are found only along stream courses or require water for breeding. Riparian vegetation covers approximately 10% of Arcata's forest holdings.

The Jacoby Creek Tract supports several area of wet glades which remain saturated throughout the year. These wet areas have been mapped and excluded from the operable timber base. Usually ringed by red alder and western red cedar, the wet glades provide microhabitats for amphibians, and provide watering

locations for mammals. Bear, fox, deer and cougar tracks can frequently be seen in these protected wet areas.

Special Management Areas

Northern Spotted Owl Activity Centers

Northern spotted owls have been federally listed a threatened species since 1990. Northern spotted owls are a long-lived, medium sized forest owl which often spend their entire adult life in one territory. Nesting sites in the Jacoby Creek Tract are monitored and protected according to California Board of Forestry rules and the federal Endangered Species Act (ESA). The NSO is also a state listed species. The City has extensive monitoring date for this species and conducts annual surveys on all of the forest holdings. A draft Safe Harbor Agreement for this species has been prepared and submitted to the US Fish and Wildlife Service. Once approved, this agreement will be amended into the City NTMP.

Riparian Areas

The maintenance of quality riparian habitat is an important issue on the forests. Since most species are dependent on riparian areas at some time in their life cycles, management activities which affect these habitats have more potential for affecting the overall wildlife resource on the City forests than any other type of activity (see Appendix G for outline of Streamside management zones).

The retention of riparian buffer strips along watercourses results in old growth stand characteristics over time. Stream buffers have been designated along class I, II and III watercourse to protect species which live in the streams and along the riparian zones.

The Class I and II riparian corridors will also function as functional wildlife habitat providing some of the needs for some species associated with late successional stages of forest development and also to provide functional connectivity between habitat types. There are some assumptions that the retention and or recruitment of late successional forest corridors along streams will actually be used by old growth specialists. Only through long term monitoring will this assumption be determined valid. Riparian areas are also discussed under the Watershed and Timber sections of this plan.

In addition to the above Special Management Areas, locations with special habitat features where timber management activities are excluded include: seeps, springs and wet soils, old growth individual trees, rock out crops, and talus slopes.

The City of Arcata is responsible for managing wildlife habitat, but not the animals themselves. Wildlife populations are the responsibility of the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service (threatened and endangered species). Hunting is not permitted in the community forest.

OBJECTIVES

Wildlife management on Arcata's forests is focused primarily on a landscape approach in managing ecosystem features that affect population size and distribution. For the most part, active measures to improve habitat will not be necessary in either of the City forests. The objectives for the next planning period emphasize the protection of key habitat structural components which are utilized by a diversity of species. Although biological diversity is an objective, it does not mean that it will stay in one place. Diversity will be maintained on a landscape scale allowing for the movement of various habitats during commodity extraction.

1. Protect and enhance selected wildlife habitats and monitor and evaluate the effects of timber harvest and stand improvement programs.

2. Protection and enhancement of habitat components will be achieved through coordination and application of timber harvesting standards. Rock outcrops and open glades will be eliminated from the available timber base. Snags and down logs will be maintained through the retention and recruitment of snags over time. Retention of dead and down materials are particularly critical in riparian areas. Thinning operations may occur within riparian areas only for the specific purpose of enhancing development of large conifers and release suppressed conifer from taller hardwoods

3. All proposed projects that involve significant ground disturbance and have the potential to alter habitat of sensitive wildlife species will be inventoried prior to implementation to determine if any sensitive species are present. If sensitive species are found, the proposed project will be modified to include appropriate mitigation measures.

STANDARDS AND GUIDELINES

1. (S) Maintain riparian buffer strip widths of no less than 75 feet along each side of class II watercourses, and 25 feet along class III watercourses. Class I watercourses shall have 75 foot 'no cut' and equipment exclusion zone as well. Forest practice rules define the watercourse protection zones beyond these widths according to slope. Pre-commercial thinning densely-stocked young stands to encourage development of large conifers or releasing young conifers from overtopping hardwood in the riparian buffers is allowed.

2. (S) A minimum 50 foot buffer of existing vegetation shall be retained around all bogs, seeps, springs, wet meadows and other wetlands.

3. (S) Allow for the natural recruitment of large woody debris to the stream channel to improve or maintain in-stream habitat quality and stream ecosystem function.

4. (S) Limit group selection harvest areas to 2.5 acres.

5. (S) Retain hardwood in stands which contain a significant hardwood component.

6. (S) Monitor habitat features by updating information from permanent CFI plots and habitat maps.

7. (S) All snags shall be retained unless deemed a hazard to humans along roads and trails or adjacent structures.

8. (S) In harvest areas, snags must be identified before harvesting begins and their location made clear to the logger to ensure the snags are not felled by accident.

9. (S) California Endangered Species Act (CESA) consultation is required with the California Department of Fish and Wildlife for any State-listed species which may potentially be affected as a result of harvesting activities.

10. (S) Maintain database on wildlife surveys completed on adjacent ownerships.

11. (G) Maintain forested dispersal corridors along ridge tops in addition to riparian corridors.

12. (G) Maintain and enhance the riparian habitat type.

13. (G) Improve habitat connectivity and reduce forest fragmentation, including the concepts of corridors and contiguous habitat.

14. (G) Increase forest structural elements in stands (snags, large trees, large diameter limbs, cavities and flat tops).

15. (G) Conduct wildlife habitat improvement projects when needed.

16. (G) Continue encouraging scientific study by HSU wildlife staff, students and researchers.

17. (G) Track land use patterns on surrounding ownerships and their possible cumulative effects on wildlife.

18. (G) Minimize fragmentation of existing forest stands on a landscape scale.

19. (G) Maintain and if necessary manipulate vegetation in special habitat areas and maintain or enhance forest stand structural diversity.

20. (G) Timber harvests will be planned to provide for snag recruitment by leaving an adequate number of living and dead trees to meet the goals for future snags. Trees providing suitable structure for wildlife include large trees and trees with broken tops, cavities, platforms, and other formations that create structure for nests and dens. These structures typically occur in the oldest trees. Staff will develop and adopt a process for identifying, and thus protecting, such trees for use by inventory and prescription-marking crews.

Periodically update the Conceptual Area Protection Plan (CAPP) and the Land Acquisition Evaluation (LEA) that the City has on file with the Wildlife Conservation Board. The development of an LAE is often prompted by some information that the (or one of the key) land owner(s) might be interested in selling their land (or an interest in their land) for conservation purposes.

CAPPs encompass larger geographic areas than an LAE and serve as planning tools for a region to protect large blocks of habitat. CAPPs typically cover an area with multiple owners, many of which may have no interest in selling at the present time. CAPPs include a prioritization of parcels where purchase or easement offers are first focused. Work with neighboring landowners, to explore opportunities for multiple-landowner, landscape-level approaches to forest restoration, including the protection and enhancement of watershed and ecological processes.

MONITORING

21. (G) Monitoring is an important element of the wildlife section of this plan. The species selected for monitoring are defined as indicator species which represent specific habitat types or habitat elements. Indicator species representing specific habitat types are intended to represent other wildlife species with similar requirements. Monitoring these species will assist in the assessment of the overall quality of the habitat over time. In addition to the ongoing monitoring of indicator species the priority for survey shall be given to:

1. listed species
2. species of special concern
3. sensitive species
4. non-listed species

Table III
Management Indicator Species (examples)

Species	Habitat Represented
hairy woodpecker	wildlife trees (snags)
pileated woodpecker	snags

spotted owl	mature & old growth forest
osprey	snags
black-tailed deer	early successional stages
Torrent salamander	healthy headwater & class II streams
Pacific fisher	complex stand structure

22. (S) The use of road oil or other dust retarding materials, except water, is prohibited.

23. (S) Areas exhibiting surface soil erosion problems are treated as they will be discovered.

22. (G) Prior to timber harvest operations or timber stand improvement practices, areas scheduled for treatment will be surveyed during late winter and spring to detect any listed species occurrence during the recognized survey period. These surveys will employ recognized protocols for each species.

23. (G) It is the intent of the management plan for the City forests to continue to recruit large-diameter snags by selecting individual co-dominate trees to manage for future large diameter snags. As the silvicultural goals for the City forests include longer rotations and increasing the late seral stage component, there will be larger diameter trees to select for recruitment as the existing large live cull cohorts die. Continuous forest inventory (CFI) plots will be used to monitor stand structure and will ensure that management activities change the stands towards the desired target.

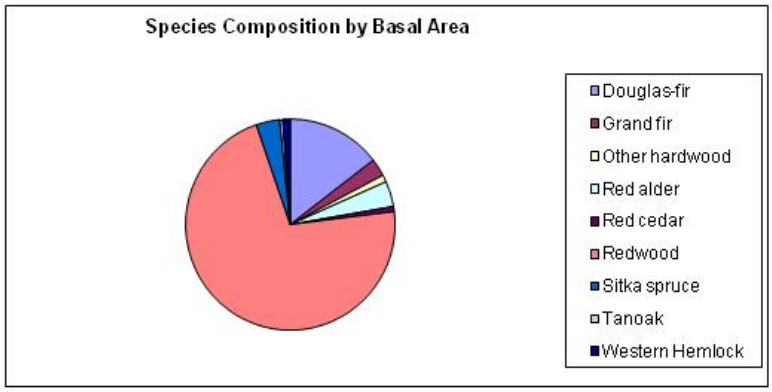
24. (G) Forest management efforts consider all native vertebrates species and are designed to maintain viable populations of all existing native species. (Threatened and endangered species populations). Management efforts shall attempt to provide for the enhancement. Several groups of species have special management needs. These groups include:

1. Species dependent on specialized habitat conditions
2. Endangered or threatened species
3. Species requiring early, mature or old growth forest conditions for optimum habitat.

25. (S) Monitor nesting pairs of northern spotted owls within the Jacoby Creek Forest and conduct periodic inventories of the Community Forest. Maintain nesting and foraging habitat in areas where management activities could alter the habitat.

26. (S) Should an unlisted species become listed during the planning period, forest management program will be adjusted to accommodate for the change in status. Exceptions will be made on a case-by-case basis using the consultation process described in the Endangered Species Act.

Jacoby Creek Forest Tract



Arcata Community Forest-Methods to Increase Stand Complexity and Tree Size

Structural Objective	Silvicultural Technique
Multi-layered canopy	• Modified single-tree selection timber harvest • Release advanced regeneration • Establish new redwood tree cohort and planting shade tolerant species in areas where they were eliminated years ago (W. Hemlock, G. Fir etc) • Retention of some trees with reiterated tops
•Elevated large snag densities	• Girdling of selected intermediate to co-dominate trees usually Sitka spruce, Grand fir and Douglas-fir
Elevated downed woody debris densities and volume	• Felling of trees and retention of large broken chunks to create large downed log material • Debris augmentation by hauling in cull logs from nearby land clearing operations
Variable horizontal density	• Thinning from below and harvest of stump sprout clusters with retention of dominant sprout tree • Variable density marking and harvest , •Reserve areas along watercourses •Modified group selection to create "gaps" ¼ < 2.5 ac.
Re-allocation of basal area to larger diameter classes	• High target basal area (275-400 ft^2/ac.)
Accelerated growth in largest trees	• Full and partial crown release of largest conifers

OPPORTUNITIES

An updated inventory of amphibians and reptiles would fill a gap in existing wildlife information.

There are opportunities to manage for late seral stage habitats which are in short supply in the immediate vicinity through application of standards within this management plan.

There is an opportunity to establish a cooperative effort involving neighboring landowners to help detect and monitor locations of nests of listed species occurring outside but close to City forest boundaries.

A Safe Harbor Agreement for the northern spotted owl may be a viable regulatory option working with the USFWS that could decreased the level of annual surveys by maintaining the forest as nest/roost habitat for this species.

There is an opportunity to expand the use of motion detection wildlife cameras to expand documentation of wildlife use in the ACF.

Additional opportunities for donated conservation easements around the ACF should be cultivated to protect wildlife corridors.

The impacts of trail density to forest dwelling and ground nesting birds and other wildlife is an area of needed research in the ACF.

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VEGETATION AND BOTANICAL RESOURCE MANAGEMENT

POLICIES

Maintain native component of species found in the redwood forest type both by controlling exotics which degrade native habitats and managing for a species mix that would naturally be found in the redwood forest type.

CURRENT SITUATION

Background

The abundance and composition of botanical resources of the City's forests is a function of climate, soil types and natural and human disturbance. The forests can be broadly described as second-growth redwood.

The redwood habitat is a composite name for a variety or mix of conifer species that grow within the coastal influence zone <50 km (31 mi) from the coast. In the north coast region of California (within 4 km (2.5 mi) of the coast), the Redwood habitat (RDW) consists of Sitka spruce, grand fir, redwood, red alder, and Douglas-fir. Western red cedar and western hemlock are also associates but seldom comprise the major portion of a stand. Redwood becomes dominant along coastal areas approximately 4 to 16 km (2 to 10 mi) from the ocean where Douglas-fir, red alder, and grand fir are its major associates. Further inland, Douglas-fir becomes dominant with tan oak and madrone as the major associates (Becking 1968, Zinke 1977).

The climax stage of the redwood habitat is distinguished by a bi-layered canopy, usually with redwood or Douglas-fir as the dominant species. Redwood is a self-perpetuating habitat, with or without fire as a disturbance. After disturbance (usually logging, fire, or flooding) succession proceeds rapidly. Initially, disturbed sites are barren with a sparse herb layer. This stage usually gives way to shrubs and redwood sprouts within 10 years. Plant communities move naturally through a series of successional (or seral) stages. This process is interrupted from time to time by natural forces such as diseases, insects or fire.

Practices of clear-cutting in the past and more recently selection timber harvest, have shaped the vegetative development of these forests more than natural forces in terms of species composition, dominance and stand structure. In light of the disturbance history, it is important to recognize that the composition and density of species existing in forested stands may not be representative of the stand's potential.

Plant Communities

The ACF is currently classified as Redwood forest type RW5S, and RW5D, RW4D using the California Wildlife Habitat Relationship (CWHR) habitat classification system. It contains the following plant communities: North Coastal Coniferous Forest, Redwood Forest.
Composition-- The redwood habitat is a composite name for a variety or mix of conifer species that grow within the coastal influence zone <50 km (31 mi) from the coast. In the north coast region of California (within 4 km (2.5 mi) of the coast), the Redwood habitat (RDW) consists of Sitka spruce, grand fir, redwood, red alder, and Douglas-fir. Western red cedar and western hemlock are also associates but seldom comprise the major portion of a stand. Redwood becomes dominant along coastal areas approximately 4 to 16 km (2 to 10 mi) from the ocean where Douglas-fir, red alder, and grand fir are its major associates. Further inland, Douglas-fir becomes dominant with tan oak and madrone as the major associates (Becking 1968, Zinke 1977).

Key to California Wildlife Habitat Relationship Vegetation Type Codes. https://wildlife.ca.gov/data/cwhr

ACF CWHR Vegetation Types		
CWHR Classification	**Average Tree Size (inches dbh[4])**	**Canopy Closure (%)**
Redwood 3D	pole size (6 - 11)	60 - 100
Redwood 3D	small tree size (11 - 24)	40 - 59
Montane Hardwood-Conifer 4D	small tree size (11 - 24)	60 - 100
Redwood 4D	small tree size (11 - 24)	60 - 100
Redwood 5D	Medium/large tree size (>24)	60 - 100
Redwood 6D	Uneven canopy trees >24″	60-100

CWHR Size Codes

Size Code	Tree Size
1	< 0″ DBH (shorter than 4 ½′ tall)
2	0-8″ DBH
3	8-16″ DBH
4	16-24″ DBH
5	24-32″ DBH
6	32-40″ DBH
7	40+″ DBH

Table A-4. CWHR Canopy Cover Codes

Cover Code	Percent Cover
S	5 – 20
P	20 – 40
M	40 – 60
D	60 – 80
E	80 – 100

According to Becking (1982), within the Community Forest the primary alliances (groupings of species) are the Redwood-oxalis, the Redwood swordfern and the Redwood-salmonberry types.

Redwood-oxalis generally occurs on the lower 1/3 slope position characterized by concave topography and moist conditions. In addition to redwood in the overstory, this type contains grand fir *(Abies grandis),* Douglas-fir *(Pseudotsuga menziesii)* and Sitka spruce *(Picea sitchensis).* The shrub layer is not well developed in this type. The herb and fern layer is dominated by redwood sorrel *(Oxalis oregana)* with other common, although less abundant, associates including wild ginger *(Asarum caudatum),* redwood violet *(Viola sempervirens),* trillium *(Trillium ovatum)* and lady fern *(Arthyrium filix-femina)(Berg,* 1988).

Redwood-salmonberry occurs on the lower 1/3 slope position as well, but is tightly confined to the drainages. Other species associated with these drainages, include thimbleberry *(Rubus paryiflorus)* and red elderberry *(Sambucus racemosa var. racemosa).* The shrub layer which can be quite dense consists of currant *(Ribes sanguineum)* and California blackberry *(Rubus ursinus).* The herb layer includes creeping buttercup *(Ranunculus repens),* lady fern *(Athyrium filix- femina)* and five-fingered fern *(Adiatum pedatum).*

Redwood-swordfern occurs on the middle to upper 1/3 slope position. Conditions of these sites are drier and warmer than the oxalis alliance sites. Canopy associates with redwood include grand fir, Douglas-fir, Sitka spruce and on occasion western hemlock *(Tsuga heterophylla).* The shrub layer of this alliance consists of evergreen huckleberry *(Vaccinium ovatum),* salal *(Gaultheria shallon)* and rhododendron *(Rhododendron macrophyllum).* Swordfern *(Polystichum munitum)* is the dominant species in the herb layer.

The Jacoby Creek Forest is at a higher elevation, is further inland and contains more highly erodible soils relative to the Community Forest. Although redwood is present in the forest, it does not maintain as high a dominance as in the Community Forest. Jacoby Creek forest contains a higher density Douglas fir and grand fir and western hemlock relative to the redwood dominated Community Forest. In addition, due to different soil types and warmer climatic conditions, hardwoods such as tanoak *(Lithocarpus densiflora),* California bay *Umbellularia californica)* and madrone *(Arbutus menziesii)* are components of many stands in the Jacoby Creek Forest.

The Jacoby Creek Tract contains numerous openings of 1/10 to 1/5 acres in size which are covered with salal. It is speculated that this is due to soil types and conditions.

Riparian

Riparian communities are named for the intermittent or continual presence of fresh water rather than the vegetation of such areas. Riparian communities are located along the edges and floodplains of streams or surrounding lakes. Due to the unstable setting and frequent disturbance, the riparian communities within all three tracts are quite dynamic in terms of their species composition and structure. Typically, the more stable stream banks are conifer-dominated (ie. Redwood- salmonberry). Those riparian zones which are less stable are dominated by red alder (*Alus rubra)* and on occasion big-leaf maple *(Acer macrophyllum).*

Recently logged areas are dominated by species well adapted to colonizing disturbed sites. Fireweed *(Erechtities hieracifolia),* thimbleberry *(Rubus parviflorus),* sword fern *(Polystichum munitum),* red alder *(Alnus rubra)* and blue blossom *(Ceanothus thyrsiflorus),* quickly become established after disturbance.

Rare Flora

In terms of botanical resources, a species list for both forests is included in the appendices of this plan. According to existing data, there are no documented occurrences of federally-listed, threatened or endangered species, nor State-listed species managed by the California Department of Fish and Wildlife. In addition to Federal and state lists, the California Native Plant Society maintains a list of species which are rare or uncommon in California. Neither Forest contains habitat which is likely to support species which are members of any of the aforementioned lists.

Invasive/Exotics

Invasive exotics have been aggressively advancing into the ACF Tract, and to a lesser extent in the Jacoby Creek Tract. Exotics have been shown to displace native plant species (McClintock, 1987). Scotch broom *(Cytisus sagittarius)* and Andean pampus grass *(Conaderia iubata)* appear to be moving into the Community forest from the west and southwest. Other invasive species scattered through the forest are Pyracantha angustifolia, English ivy (*hedera helix)* and Himilayan blackberry *(Rubus discolor).* In this climatic regime, these plants have the ability to alter or even displace native plant communities.

Efforts will be made to control existing invasive plant populations, reduce opportunities for further spread of existing species, and prevent the introduction of other species not currently present on ACF.

OBJECTIVES

1. Maintain the indigenous plant composition in the redwood biome through active management, planting of species mix and use of local seed sources:

a. Maintain and enhance when appropriate the riparian plant community.

b. Identify and protect habitat of designated sensitive species in accordance with State and Federal policy.

c. Educate forest users of the value of the botanical forest resources during interpretive programs.

d. Maintain control of invasive non-native species.

e. Revegetate denuded areas· resulting from recreational misuse or overuse.

Note: *See the Timber Resource Management standards and guidelines section for additional information on vegetation management.*

STANDARDS AND GUIDELINES

1. (S) Survey for listed and non-listed species during timber harvest planning inventories and when monitoring of continuous forest inventory plots. Surveys should be conducted under the protocol guidelines for "Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities Nov. 2009" sanctioned by CDFW at https://www.dfg.ca.gov/wildlife/nongame/survey_monitor.html.

2. (S) Examine the California Natural Diversity Database (CNDDB) reports during project planning and incorporate measures into all project development and monitoring processes for all known species as well as special status species that may be present. Submit CNDDB Field Survey forms to CDFW for any sightings of listed, rare or special status species.

3. (S) Prohibit the general collection of floral greenery, flowers, mushrooms and other plant material for individual use and commercial purposes.

4. (S) Wet meadows, bogs, salal glades and rock outcrops shall be removed from the timber base and road building through these areas shall not be permitted.

5. (G) Remove pampas grass, Scotch broom, holly, English ivy and other pest species as staff and volunteer labor availability warrants using non-chemical methods including, backhoes, hand tools and fire.

6. (G) Restoration and revegetation efforts shall attempt to use local seed. For example, big leaf maple seed should be collected on the forests for propagation and use in riparian restoration efforts.

7. (G) Prevent ground disturbance of wetlands and manipulation of the vegetation in the surrounding riparian community unless deemed appropriate to maintain riparian component.

8. (G) For erosion control- use rice straw and when not available certified weed free wheat straw.

9. (G) Conduct vegetation control in young plantations in order to speed up the succession process using non-chemical methods.

10. (G) Prescribed fire may be used as a restoration tool to maintain habitat and/or plant community diversity.

11. (G) Plan and implement a new treatment program for invasive plant species, which expands treatment options, identifies treatment priorities, and includes an early detection-rapid response component.t
12. (G) Increase tribal participation and knowledge in the protection of valued habitats and resources.

OPPORTUNITIES

Produce an updated ACF flora and include fungi, lichens and mosses.

There is an opportunity to greatly expand efforts to eradicate and control non-native plants. Outreach to community volunteers could result in an increased labor pool for assistance with control efforts.

Measure and monitor impacts to species composition (especially *Oxalis oregano)* from pedestrian use within the heavily used area east of Redwood Park and prescribe recovery measures.

Map CWHR habitat types on the entire forest.

Enhance coordination with Humboldt State University students and faculty so as to eliminate duplication of efforts in plant inventories and studies.

CHAPTER 4

MONITORING AND ADAPTIVE MANAGEMENT - *The road to success is always under construction.*
-Lily Tomlin

Monitoring provides information to help determine if the City of Arcata forest management activities are meeting the management Plan's objectives and are adhering to the Plan's Standards as well as responding to concerns from other agencies, the public and management.

Adaptive management is one approach for dealing with uncertainty. It requires clear goals, an understanding of alternatives, observation and monitoring, and the ability to adapt management decisions to new information. It is a critically important tool when decisions have to be made in uncertain circumstances. Much of forest management is experimental. This requires revisiting actions and change course—to adapt—when circumstances warrant

Through the monitoring process determinations may be made as to whether the Plan needs to be amended or management activities need to be redesigned.

Discussion on monitoring specific resources may also be found within the individual resource management sections in Chapter 3.

MONITORING PROCESS

The activity or resource monitoring process follows the following format:

I. Activity to be monitored

II. Monitoring objective

III. Methods/techniques: A description of how data will be gathered.

IV. Precision or validity: Both precision and validity are rated quantitatively as high medium or low.

V. Frequency reporting period: The minimum frequency for data gathering or period for reporting data.

VI. Variations from standards requiring further action: When this limit is exceeded, the cause of the variation must be rectified or the monitoring process modified whichever is appropriate.

The Arcata Forest Management Advisory Committee will evaluate monitoring results annually. An annual report summarizing projects, measurements and observations will be made to the City Council and made available to the public.

Monitoring will be performed by City Environmental Services Department staff, University student items, volunteers and contracted consultants. The Forest Management Committee conducts annual post-harvest monitoring visits that include a detailed evaluation of the harvest operations.

WATERSHED MONITORING

<u>TIMBER OPERATIONS</u>

To avoid adverse impacts on water quality and fisheries resulting from the discharge of sediment to watercourses attributable to timber operations, staff will monitor all timber operations (including all harvesting areas and new roads, skid trails, and landings) annually for five to seven years following completion of the operations. Occurrences of substantial surface erosion (i.e., gullies) or mass wasting (i.e., landslides or

slumps) resulting from the operations will be identified and described by a Registered Professional Forester (RPF).

Each substantial gully or landslide will be evaluated to determine its cause and identify stabilization measures that would be most feasible, effective, and cost effective. Such measures will be implemented within 90 days from the date when the subject site is identified, unless due cause for delay is explained and a reasonable alternative schedule for implementation is proposed by the SDSF Forest Manager. If, based on the judgment of a Certified Engineering Geologist (CEG), no stabilization measures are feasible or reasonable to apply to the subject site, feasible offsite watershed remediation measures will be implemented as recommended by the CEG in conjunction with the next timber operation conducted at the ACF.

City staff will describe appropriate mitigation measures to be incorporated into future timber operations and specified in future Noticed of Timber Operations (NTO's) to avoid a recurrence of the observed erosion or mass wasting events.

NUISANCE MONITORING

To minimize nuisance impacts on ACF neighbors, City staff will record and compile descriptions of all reported nuisances caused by ACF users at ACF or on adjacent ownerships including, but not limited to, trespass, vandalism, littering, and noise. This information has not been compiled into a comprehensive report, but the data are examined by staff to evaluate any trends.

City staff work closely with individuals and groups of volunteers to assist in this effort. The Trail Stewards and a local Mountain Bike Patrol groups have both contributed information to the nuisance monitoring database. City staff have developed good relationships with neighbors to prevent incidents that constitute a nuisance.

CULTURAL RESOURCE MONITORING

Staff will monitor and periodically inspect heritage resources on the ACF to ensure that existing policies are affording effective protection. The identification and protection of cultural resources are important components of forestry in California today. Registered Professional Foresters are required to attend archaeological training classes to acquire the ability to recognize cultural materials, and to be able to develop effective protection measures. In its role as a demonstration forest, the ACF can serve as a proving ground for the development and implementation of effective heritage resource management strategies.

Table V. Additional Monitoring Activities and Standards

Activity to be monitored	Monitoring objective	Methods/ techniques	Expected precision/ validity	Frequency reporting period	variation from standards requiring further action
Recreation					
Dispersed Recreation	Determine if adverse effects on natural resources are occurring.	photograph	**medium**	annually	visible damage to trails within creek zones & obvious rule infractions
	Does use meet public expectations?	use of survey box at access points	high	5 years	revise plan if recreation demands
Recreation use on land & resources	Determine if adverse effects on natural resources are occurring	photograph and field surveys	high	annually	deviation from standards in recreation section

Reforestation	Determine success of regeneration	stocking surveys defined in state forest practice rules	high	2nd growing season after reforestation & until certified stocking report filed	described in CCR 1071
Growth/ Mortality	Update timber inventory Assess whether harvest levels exceed growth rates	measurement of permanent plots review stand inventory data	high	5 years	more than 10% deviation below predicted levels
<u>Wildlife</u> Spotted owl		field surveys in accordance with established protocols	medium	project basis	analysis of data with other adjoining landowners & regulatory agencies to determine
Pileated woodpecker/ hairy woodpeckers	Monitor snag densities to assure standards are being met.	during timber inventory field work	high	prior to harvest activities or every 5 years	more than 10% deviation below stated snag objectives
Amphibians & reptiles	Determine habitat use & distribution.	field surveys	medium	project basis or when wildlife students are available	
Quality & distribution of down logs	Ensure minimum quantity & quality of down logs & woody debris.	field surveys during CFI plots & inventories	medium	5 years	any detectable decline in down logs from standards & guidelines

Table V. Monitoring Activities and Standards, contd.

<u>Watershed</u> Water quality	Assess compliance with plan direction & evaluate the effectiveness of standards	field observations & reviews[1], (use maximum daily temperature)	medium	ongoing	water quality objectives violated
Watershed improvement Soil productivity	Evaluate effectiveness of restoration measures	observations & field measurements inspection of culverts	medium	5 years	survival of project over a 10 year period
Soil compaction		visual inspection, infiltro-meters	medium	ongoing or every 5 years	meet soil quality standards on

Cumulative effects Riparian/ wetlands	Are cumulative effects an issue? Do resource protection measures & standards protect riparian/wetland areas & their associated values?	field review by an interdisciplinary team, survey activities on surround-ing private lands fisheries/ aquatic organism & habitat surveys, electrofishing & netting	medium	annually & prior to harvest 3/5 years, or when HSU students are available	logged areas 20% deviation below desired levels of habitat quality
<u>Pest Management</u>	Early detection & evaluation of pest related problems.	Timber stand exams	medium	annually/ as needed	pest damage levels must not conflict with attainment of timber objectives detection of swiss needle cast fungus spread
<u>Facilities</u> Roads & trails & parking areas Signage	Do forest roads & trails provide safe use by public?	annual survey of roads & trails	high	annually	any unsafe condition will be remedied as soon as possible
<u>Vegetation</u>	Is non-native vegetation becoming a problem?	visual inventory plot data	medium	annually	non-native will be removed as resources allow

Monitoring FMP Implementation Challenges

The Community Forest activity is funded almost exclusively by revenue derived from commercial timber harvesting. Maintaining sufficient funds for proper management of the forest is a challenge for the City during poor market conditions for timber. This can be minimized somewhat by attempting to time timber harvests with market peaks and by developing a reserve account for the forest that cannot be used for other purposes. Additionally, the regulatory environment for forestry and restoration in California is a particularly burdensome process even for management systems such as Arcata's relatively light touch harvest regime. More often than not, responding to a multi-agency permitting process diverts resources that may otherwise be directed toward restoration, recreation, or monitoring efforts. Many people involved in forestry in California, from industrial timberland managers to environmental groups, recognize that this problem is especially onerous on small-forest landowners and community-based forestry programs. Within the past 5 years, a market premium has been observed for larger diameter redwood logs, which has benefited Arcata economically. In addition, managing for larger logs has decreased logging and trucking costs. This has been especially important given the average haul distances to some of the regional sawmills.

Collaboration with conservation biologists and ecologists must be continually nurtured in order to provide information and maintain credibility to the restoration program. This can best be accomplished through a monitoring program that has clear goals and indicators of success. Given the small area of the land base, managing for species that require large landscapes is difficult. As urbanization continues to be a threat around

the plan area, the City is actively engaged with industrial landowners, local land trusts, and the county of Humboldt to minimize parcelization or fragmentation so that the Community Forest is buffered from non-compatible uses such as residential uses.

Climate change also presents a particular challenge that requires a long-term approach to prepare the forest ecosystems to be as resilient as possible to stress caused by droughts, severe storms, and changes in species compositions.

Explaining to the public the complexity of forest management, especially using a tools such has a timber harvests to mimic episodic disturbances, is a continuing challenge that requires educational outreach. For example, our goal of thinning to accelerate the development of old-growth characteristics that have been simplified by past management is a difficult concept to explain to people, especially those who may have recently moved to the redwood region. There has been some skepticism that logging is a justifiable tool that can actually benefit the forest ecosystem. Involvement of community volunteers is a fundamental part of community-based forestry. Volunteer stewards engaged with land managers helps develop a constituency that will be better informed and prepared to accept the responsibilities associated with the privilege of owning a community forest.

The Forest Management Committee, whose average tenure has been 19 years, provides an important access point for public involvement. The members are well known and respected in the community, and this has helped the program weather political and economic shifts over the years. Certification by the FSC, annual audits, and transparent third-party monitoring of the forestry operations have also given the public and the City council a level of confidence that the forest resources are being managed in accordance with ecological principles.

Chapter 5

RESEARCH AND DEMONSTRATION

The ACF provides an attractive outdoor laboratory for education and research. The forest now has a variety of stands from young to old forest structure that are well sutured for study. While education and research and studies are ongoing and frequent in the ACF, periodically the City staff and the Forest Management Committee post potential research questions that are of interest for informing management.
Some of these questions or topics include:

- Climate change and carbon sequestration potential of the forest;
- Recreational use impacts for wildlife;
- Plant community dynamics;
- Forest health and productivity;
- Wildlife habitat use;
- Recreational user preferences;
- Soil organic carbon trends; and
- Evaluation of density impacts on ground nesting bird and other wildlife.
- Quantitative and qualitative study of recreation use. Outputs would include statistical information on recreational use. Studies should document public perceptions on how well our existing facilities serve their needs.

Objectives

1. Continue to provide access to the ACF as an outdoor laboratory where researchers from universities, state and federal agencies and NGO's can conduct targeted and long-term research projects that address forests and forest management.
2. Encourage that all study results are documented and made available the City.
3. Provide field tours to groups and individuals to explain research projects and encourage presentations to the public at City facilities such as the Arcata Marsh Interpretive Center
4. Maintain forest datasets to make available to potential researchers.
5 The public should have access to information about the Arcata Community Forest mission as well as past and current projects. This will be facilitated by the Arcata Community Forest web site, which will be housed at the City of Arcata. Past and current project reports and publications will be available, as will data sets. This will encourage building on past projects and using multidisciplinary approaches when researchers are developing proposals.

GLOSSARY AND REFERENCES

GLOSSARY

Acre-foot: The amount of water or sediment that would cover one acre to a depth of one foot (43,560 cubic feet; 326,000 gallons).

Adaptive management: A dynamic approach to forest management in which the effects of treatments and decisions are continually monitored and used, along with research results, to modify management on a continuing basis to ensure that objectives are being met.

Activity: The work processes or management practices that are conducted to produce, enhance or maintain outputs or achieve administrative and environmental quality objectives. An activity can generate multiple outputs.

Activity fuels: Burnable material created by various management activities.

Affected environment: The natural, physical and human-related environment that is sensitive to changes due to proposed actions.

Age class: One of the intervals into which the age range of trees is divided for classification or use.

Anadromous fish: Fish that are born and reared in fresh water which move to the ocean and later return to fresh water to reproduce.

Appurtenant Road means a Logging Road under the ownership or control of the Timber Owner, Timberland Owner, Timber Operator, or plan submitter that will be used for log hauling.

Aspect: Direction or exposure of terrain towards which a slope faces.

Assessment area: A delineated area of land subject to analysis of: (1) responses to proposed management practices in the production, enhancement, or maintenance of forest outputs and environmental quality objectives and, (2) economic and social impacts.

Association: A kind of plant community with a definite species composition and structure, and relatively uniform environment (Plant Ecology).

Background level (background, natural background): The ever-present environmental conditions or effects above which a phenomenon must manifest itself in order to be detected.

Basal area: The cross-sectional area, in square feet, of a tree measured at breast height (4.5 feet).

Best management practice (BMP): The method, measure or practice selected by an agency to meet its nonpoint source pollution control needs. BMP's include, but are not limited to structural controls, operations, and maintenance procedures. BMP's can be applied before, during and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

Biological diversity: The distribution and abundance of different plant and animal communities and species over time and space.

Blowdown: Trees felled by high winds.

Board foot (BF): A unit of measurement equal to an unfinished board one foot square by one inch thick.

Broadcast burn: Allowing prescribed fire to bum over a designated area for reduction of fuel hazard, or as a silvicultural treatment.

California Environmental Quality Act (CEQA): Following the passage of NEPA, the California State Legislature passed an Act in 1970 to declare state policy which will ensure the long-term protection of the environment. The Act will encourage the development and maintenance of a high quality environment now and in the future; provide the people of California · with clean air and water, enjoyment of aesthetic, natural, scenic, and historic environmental qualities, and freedom from pollution; and prevent the elimination of fish or wildlife species due to man's activities.

Canopy: The uppermost spreading, branchy layer of a forest.

Canopy closure: The progressive reduction in space between tree crowns as they spread laterally; a measure of the percent of potential open space occupied by the collective tree crowns in a stand.

Cavity nester: Wildlife species that excavate and/or occupy cavities in trees and snags.

Clearcutting: Harvesting of all trees in one area for the purpose of creating a new, even-aged stand. The area harvested may be a patch, stand or strip.

Climax: The culminating stage in plant succession for a given site where the vegetation has reached a highly stable condition.

Codominant: One main crown class of trees with their tops in the upper canopy but lower than the dominant trees.

Commercial thinning: Timber sales which call for selective harvest in immature stands designed to improve the quality and growth of the remaining trees.

Conk: Projecting fruit-body of a wood-destroying fungus.

Conversion (management): A change from one silvicultural system to another (e.g. from hardwood to conifer forest), or from one tree species to another.

Cord: Wood stack equivalent to 128 cubic feet (4 x 4 x 8 feet).

Cover: Vegetation used by wildlife for: protection from predators; to ameliorate conditions of weather; or in which to reproduce.

CMAI: The age at which the average annual growth is greatest for a stand of trees. Mean annual increment is expressed in cubic feet measure and is based on expected growth according to the management, harvest yields and any additional yields from planned intermediate harvest.

Created opening: An opening in the forest created as the result of even-aged silviculture through clearcutting, group selection, or shelterwood regeneration timber harvest systems.

Cruise: A survey of land performed to locate standing timber and estimate its quantity by species, products, size quality, or other characteristics. The estimate obtained in such a survey.

Cubic feet per second (cfs): A unit of measure applied to fluid flow, a rate of discharge.

Cultural resources: Buildings, sites, areas, architecture, memorials, and objects having scientific, prehistoric, historic, or social values.

Cumulative effect: The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Defect: Any irregularity or imperfection in a tree, log, or wood product that reduces its soundness, durability, strength or utility.

Departure: A schedule which deviates from the principle of nondeclining flow by exhibiting a planned decrease in the sale schedule at any time during the planning horizon. A departure is characterized by a temporary increase, usually in the beginning decades(s) of the planning horizon, over the base sale schedule originally established. This increase does not impair the future attainment of the long-term sustained yield capacity.

Dependent species: A species for which a habitat element (snags, vegetative type) is deemed essential for the species to occur regularly or to reproduce.

Diameter at breast height (DBH): The diameter of a standing tree measured at a point four feet-six inches from ground level on the uphill side.

Dispersed recreation: Outdoor recreation in which visitors are diffused over relatively large areas. Where facilities or developments are provided, they are more for access and protection of the environment than for the comfort or convenience of the people.

Down log: Portion of a tree that has fallen or been cut and left in the woods.

Ecosystem function: The manner in which organisms interact with each other and their environment.

Edge: Where plant communities meet or where successional stages of vegetative conditions within plant communities come together, e.g. field and woodland, forest and meadow.

Effects (impacts): Environmental consequences (the scientific and analytical basis for comparison of alternatives) as .a result of a proposed action. Effects may be either direct, which are caused by action and occur at the same time and place; indirect, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable; or cumulative (see definition above).

Endangered species: Any plant or animal species which is in danger of extinction throughout all or a significant portion of its range (Endangered Species Act of 1973).

Endemic species: A species whose natural occurrence is confined to a certain region and whose distribution is relatively limited.

Environment: The aggregate of physical, biological, economic and social factors affecting organisms in an area.

Environmental impact statement (EIS): A detailed statement prepared by the responsible official in which a major Federal action which significantly affects the quality of the human environment is described; alternatives to the proposed action are provided; and the effects are analyzed.

Erosion: Detachment or movement of soil or rock fragments by water, wind, ice, or gravity. Accelerated erosion is much more rapid than normal, natural or geologic erosion, primarily as a result of the influence of activities of man, animals or natural catastrophes.

Fire Protection Zone: means that portion of the logging area within 100 ft. (30.48 m), as measured along the surface of the ground, from the edge of the traveled surface of all public roads and railroads, and 50 ft. (15.24 m) as measured along the surface of the ground from the traveled surface of all private roads, and within 100 ft. (30.48 m), as measured along the surface of the ground, from permanently located structures currently maintained for human habitation (Ref. Sec. *[4562]*, PRC).

Flood Flow: An overflow of water that submerges land that is usually dry.

Fish and Wildlife Service: A division within the U.S. Department of the Interior.

Forb: Any herbaceous plant other than grasses or grass-like plants.

Forester: A professionally trained individual who supervises the development, care and management of forest resources to include timber, wildlife and recreation. In California foresters are licensed by the State. A Registered Professional Forester (RPF) is a person who holds a valid license as a professional forester.

Fragmentation: The process of reducing size and connectivity of stands that compose a forest.

Fry: The life stage of salmonid fish species that refers to the juvenile fish which have either not emerged from the gravel, or have recently emerged.

Shaded Fuelbreak: A shaded fuel break is a forest management strategy used for mitigating the threat of wildfire in areas where natural fire regimes have been suppressed, leading to a dangerous buildup of combustible vegetation. Constructing a shaded fuel break is the process of selectively thinning and removing more flammable understory vegetation while leaving the majority of larger, more fire tolerant tree species in place.

Fuelwood: Wood that is round, split, or sawn and/or otherwise general refuse material cut into short lengths or chipped for burning.

Full log suspension: The system of transporting logs from the cutting site to the landing without touching the ground.

Geographic Information System (GIS): An information processing technology to input, store, manipulate, analyze and display spatial resource data to support the decision making processes of an organization. Generally, an electronic medium for processing map information, typically used with manual processes, to effect specific decisions about the land base and its resources.

Group selection: The cutting method in which trees are removed periodically in small groups resulting in openings that do not exceed an acre or two in size. The result is an uneven-aged stand.

Guideline: An indication or outline of policy or conduct.

Habitat: The natural environment of a plant or animal.

Hard snag: A snag composed primarily of sound wood, particularly sound sapwood; generally merchantable.

Hardwood: A conventional term for the wood of broadleaf trees. Hardwood areas reference herein are usually the result of past forest fires, which supported conifer trees in the past.

Hazard reduction: Any treatment of forest fuels that reduces the threat, ignition or spread of wildfire.

Herbicide: A substance used to inhibit or destroy plant growth.

High-lead (cable) logging: Method of powered cable logging in which the main block is fastened high on a spar tree (or equivalent) to enable the front end of the logs being skidded to be lifted clear of the ground.

Indicator species: Species of fish, wildlife or plants which reflect ecological changes caused by land management.

Individual tree selection: The selection of trees for harvest based on individual tree characteristics.

Infiltration: The movement of water through the soil surface.

Inner gorge: A stream reach bounded by steep valley walls that terminate upslope into a more gentle topography.

Intermediate (crown class): One main crown class of trees with their tops in the middle canopy.

Intermediate harvest: Most commonly used intermediate cuttings are release, thinning, improvement and salvage.

Intermittent streams: Streams that do not contain water year-round.

Landing: Any place where round timber is assembled for further transport, usually in the woods.

Layout: Preparation of a soft bed in order to cushion the fall of a large tree and thus prevent excessive breakage. Usually involves tractors pushing soil into a pile.

Leader: The highest growing tip on a tree.

Litter layer: The loose, relatively decomposed organic debris on the surface of the forest floor typically made up of leaves, bark and small branches.

Long-term sustained yield (LTSY): The estimated timber harvest that can be maintained indefinitely over time, once all stands have been converted to a managed state under a specific management intensity consistent with multiple use objectives.

Management direction: A statement of multiple use and other goals and objectives, the management prescriptions, and the associated standards and guidelines for attaining them.

Management emphasis: The primary focus of a multi-resource management prescription.

Management indicator species: Management indicator species are animals or plants selected for special attention in the Forest Plan for one or more of three reasons. These include: 1) emphasis species: species to be managed as key resources on the basis of identified issues (e.g., threatened, endangered, rare, sensitive, harvest or special interest species); 2) special habitat indicators: species that require special habitat such as snags, riparian, old-growth forest stands, etc.; 3) cumulative ecosystem change indicators: species generally having large home ranges, requiring diverse habitat.

Management prescription: Management practices selected and scheduled for application on a specific area to attain multiple-use benefits and other goals and objectives.

Mass movement: The downslope movement of earth by gravity. Includes but not limited to: landslides, rock falls, debris avalanches and soil creep.

Mean Annual Increment: The average annual growth of a stand, calculated by dividing the total growth accrued over its life by its age in years at the time of measurement.

Mensuration: That branch of forestry concerned with the determination of the dimensions, form, increment and age of trees, individually or collectively, and of their products.

Mesic: Pertaining to, or adapted to an area that has a balanced supply of water.

Mixed-evergreen forest: A forest community that is dominated by two or more species of broad-leaved hardwoods whose foliage persists for several years. Local species include Tanoak, Madrone and California bay-laurel.

Monitoring: A process of collecting information to evaluate whether objectives and anticipated, or assumed results of the management plan are being realized.

Mortality: The loss of a population of trees, other plants and animals due to all lethal causes.

Multistoried: Forest stands that contain trees of various heights and diameter classes which therefore support foliage at various heights in the stand.

Nesting, roosting and foraging habitat: The forest vegetation with the age class, species of trees, structure, sufficient area and adequate food source to meet some or all .of the life needs of the northern spotted owl.

Net scale: The scale of a log after deduction for defect.

Nonpoint source pollution: Water pollution that does not result from a discharge at a specific, single location (such as a pipe) but results from land runoff and is normally associated with agricultural, silvicultural or urban runoff.

Objective: Specific statement of measurable planned results to be achieved within a stated time period. Reflects alternative mixes of all outputs or achievements which can be attained at a given budget Level.

Overstory: The portion of trees in a forest which forms the uppermost layer of foliage.

Perennial streams: Streams which normally flow throughout the year.

Plant associations: A plant community type based on land management potential, successional patterns and species composition.

Plant community: An association of plants of various species found growing together in different areas with similar site characteristics.

Plantation: A stand of trees resulting from planting or artificially seeding an area.

Pre-commercial thinning: The selective felling or removal of trees in a young stand, conducted to accelerate diameter growth on remaining trees, maintain a specific stocking density and improve vigor and quality of remaining trees. Conducted at an age before the trees are commercially merchantable.

Prescribed fire: Intentional use of fire under predetermined weather and fuel conditions to achieve specific objectives such as rejuvenating or type-converting vegetation.

Programmed harvest: Timber scheduled for harvest for a specific time period.

Reach: A continuous unbroken stretch of a stream with homogeneous characteristics; an extremity of a stream; a specified portion of a stream.

Recruitment: Replenishment. In terms of wildlife biology, to achieve successful reproduction or to replenish a supply of habitat elements, such as snags or down logs.

Reforestation: The natural or artificial restocking of an area with forest trees; includes measures to obtain natural regeneration, as well as tree planting and seeding.

Regeneration: The renewal of a tree crop, whether by natural or artificial means. Also the young tree crop (seedlings and saplings) itself.

Regulation: Manipulation of the growing stock so that it contains a proper proportion of young, middle-aged and mature trees in order to obtain continuous production or sustained yield.

Release: All work done to free desirable trees from competition with other, less desirable vegetation.

Resilience: The ability of a social or ecological system to absorb disturbances, while retaining the same basic structure and ways of functioning, the capacity for self-organization, and the capacity to adapt to stress and change.

Right-of-way: An accurately located land area within which a user may conduct operations approved by, or granted by the landowner.

Riparian areas: Terrestrial areas where the vegetation and microclimate are influenced by perennial and/or intermittent water, associated high water tables and soils which exhibit some wetness characteristics; this habitat is transitional between true bottom land wetlands and upland terrestrial habitats and, while associated with water courses, may extend inland for considerable distance.

Ripping: The process of breaking or loosening compacted soil to allow root penetration for young seedlings (e.g. landings and skid trails).

Rotation: The planned number of years required to establish and grow timber to a specified condition or maturity for regeneration harvest (including the regeneration period).

Salmonid: Member of the fish family salmonidae, includes salmon and trout.

Salvage: Removal of recently-dead or dying trees to minimize the loss of wood products.

Second growth (young growth): Timber stands established after natural or human-caused removal of the original stand or previous forest growth.

Sediment: Solid material, both mineral and organic, that is suspended in, or being transported by water.

Sediment yield: The quantity of soil, rock particles, organic matter or other dissolved or suspended debris that is transported through a cross-section of stream in a given period.

Selection cutting: The annual or periodic removal of trees, individually or in small groups, from an uneven-aged forest in order to realize yield and establish a new stand of irregular constitution.

Seeps: Places where water oozes from the ground.

Sensitive species: Those species that are under consideration for official listing as endangered or threatened species; or are on an official state list as needing special management attention.

Seral stage: A transitory or developmental stage of a biotic community in an ecological succession (does

not include climax successional stage).

Shelterwood cutting: A regeneration method under an even-aged silvicultural system. A portion of the mature stand is retained as a source of seed and/or protection during the period of regeneration. The mature stand is removed in two or more cuttings.

Silviculture: The art and science of growing and tending forest vegetation, i.e. controlling the establishment, composition and growth of forests for specific management goals.

Silvicultural system: A management process whereby forests are tended, harvested and replaced resulting in a forest of distinctive form. Systems are classified according to: the method of carrying out the tellings that remove the mature trees and provide for regeneration; and to the type of forest thereby produced.

Site: Productive capacity of an area to produce forests or other vegetation. Related to climatic, biotic and soil factors for forest crops. It is expressed by a site index based on height of dominant trees in a stand at a certain age. Site indices are sometimes grouped into site classes.

Site preparation: Removal of unwanted vegetation, slash, roots and stones from a site before reforestation.

Skid: To remove a severed tree from its stump to a collection point where it is loaded onto another vehicle.
Slash: The residue of trees left on the ground after timber cutting or after other disruptions such storms or fires. Slash includes unutilized logs, uprooted stumps, broken stems, branches, twigs, leaves, bark and chips.

Slope stability: The resistance of a natural or artificial slope surface to failure by land sliding (mass movement).

Snag: A standing dead tree.

Soil compaction: An increase in bulk density (weight per unit volume) and a decrease in soil porosity resulting from applied loads or pressure.

Soil productivity: Capacity or suitability of a soil for establishment and growth of a specified crop or plant species, primarily through nutrient availability.

Soil series: A group of soils developed from a particular type of parent material having naturally developed horizons that are similar in characteristics and arrangement in the soil profile.

Spatial: Referring to the distance, interval, or area between or within things.

Species diversity: The distribution and abundance of different plant and animal communities and species.

Stand: A community of trees or other vegetation sufficiently uniform in composition, constitution, age, spatial arrangement or condition to be distinguishable from adjacent communities and so form a silvicultural or management entity.

Standard: A principle requiring a specific level of attainment; a rule to measure against.

Steelhead: A large-sized, silvery anadromous rainbow trout.

Stocking: The degree to which trees occupy the land, measured by basal area and/or number of trees by size and spacing; compared with a stocking standard, that is, the basal area and/or number of trees

required to fully utilize the land's growth potential.

Stream class: The classification of streams according to their beneficial uses. Whole streams or parts of streams can be classified. One stream may be divided into several classes.

Class I. Perennial or intermittent streams have one or more the following characteristics: (1) is the direct source of water for domestic use (cities, recreation sites, etc.); (2) are used by large numbers of fish for spawning, rearing or migration; (3) have sufficient flow to have a major influence on the water quality of a Class I stream.

Class IL Perennial or intermittent streams have one or both of the following characteristics: (1) are used by non-fish aquatic species (e.g. salamanders, benthic insects, etc.); (2) have sufficient flow to have a moderate influence on downstream quality of a Class I or II stream.

Class III. Intermittent streams not meeting Class I or Class II definitions.

Class IV. All man-made watercourses such as inboard ditches or those not meeting Class I, II or III definitions.

Structure: The various horizontal and vertical physical elements of the forest.

Successional stage: A phase in the gradual changing of a biological community (same as seral stage).

Surface erosion: The detachment and transport of soil particles by wind, water or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in rills, or by dry ravel.

Suspended sediment: Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Sustained yield: The yield that a forest can produce continuously at a given intensity of management.

Talus: The loose accumulation of fragmented rock material on slopes, especially at the base of a cliff.

Tethered Operations: Tractor Operations which utilize synchronized cable winch systems which have been specifically designed or modified by the manufacturer or a Professional Engineer, as described within the Professional Engineers Act (Chapter 7 of Division 3 of the Business and Professions Code), to assist equipment in felling or Yarding during Timber Operations.

Terrestrial: Living on land; distinguished from aquatic (living in water).

Threatened species: Any species of plant or animal which is likely to become endangered in the foreseeable future throughout all, or a significant portion of its range.

Timber site index: A measure of site productivity based on the maximum rate of tree height growth. It is normally expressed as the height in feet reached by a tree at a given, or base age (the site index).

Timber stand improvement (TSI): Measures such as thinning, pruning, release cutting, prescribed fire, girdling, weeding, etc., of unwanted trees with the objective of improving growing conditions of the remaining trees.

Tolerance: The forestry term for expressing the relative capacity of a tree to compete under low light and high root competition.

Tolerant Trees - trees which reproduce and form understories beneath canopies of less tolerant trees or

even beneath shade of their own species.

Tractor Operations -means any activity which is associated with Timber Operations and is performed by wheel or track mounted ground-based equipment, including, but not limited to, tractors or skidders.

Intolerant Trees - trees which reproduce successfully only in the open, or where the canopy is greatly broken.

Turbidity: The optical property of water as affected by suspension of material such as sediment, i.e. the muddy or cloudy state of water.

Underburning: Prescribed burning of the forest floor for botanical, wildlife habitat, fire hazard reduction or silvicultural objectives.

Understory: Vegetation growing under the canopy formed by taller trees (trees or shrubs).

Uneven-age management: The application of a combination of actions needed to simultaneously maintain continuous high-forest cover, recurring regeneration of desirable species, and orderly growth and development of trees through a range of diameter or age classes to provide a sustained yield of forest products. Cutting is usually regulated by specifying the proportion of trees of particular sizes to be retained in each area, thereby maintaining a planned distribution of size classes. Cutting methods that develop and maintain uneven-aged stands include single-tree and group selection.

Vertical diversity: The diversity in a stand that results from the complexity of the aboveground structure of the vegetation.

Viable population: A population of plants or animals large enough and distributed in such a way as to ensure their continued existence over a specified period of time, usually on the order of decades to centuries.

Viewshed: A total landscape seen or potentially seen from specific points on a logical part of a travel route or water body.

Watershed: The land area drained by a river system.

Wetlands: Areas that are inundated by surface or ground water with a frequency sufficient to support, and that, under normal circumstances do or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, wet meadows, river overflows, mud flats and natural ponds.

Wildland-urban interface: Any area where man-made improvements are built close to, or within, natural terrain and flammable vegetation, and where high potential for wildland fire exists.

Wildlife tree: A snag or a live tree designated for wildlife habitat.

Windfall: Trees or parts of trees felled by high winds (see blowdown).

Yield table: A table showing the progressive change in a stand's development at periodic intervals covering the range of age of a species on given sites. It may include information on average diameter and height, basal area, number of trees, volumes of thinnings and final cuts, and other essential data.

Yield tax: A tax levied on timber at the time it is harvested. It is based on stumpage value from Board of Equalization published quarterly reports.

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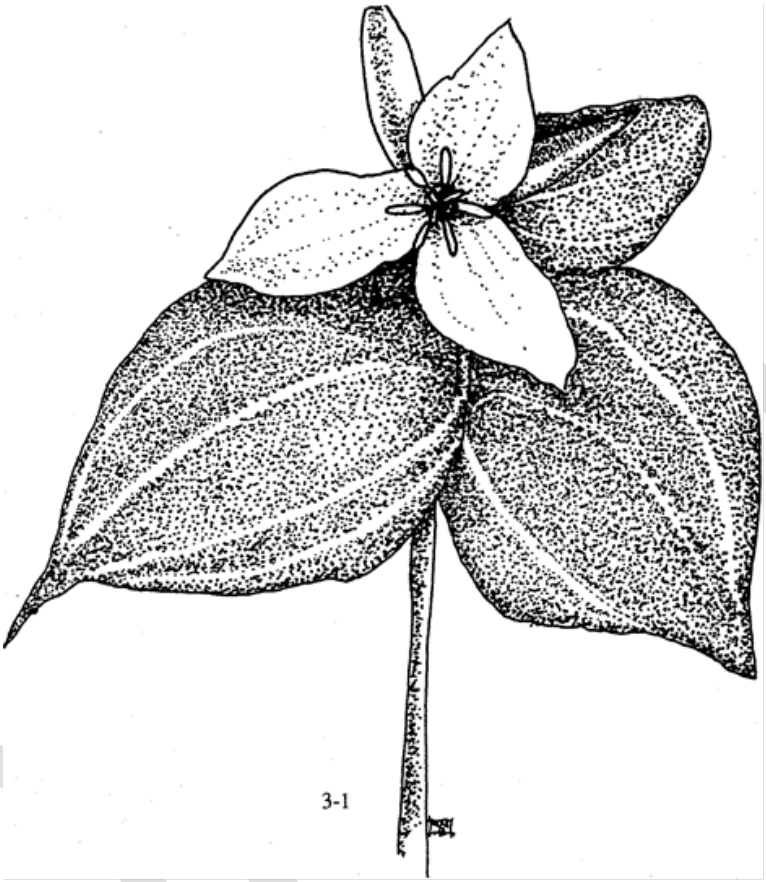
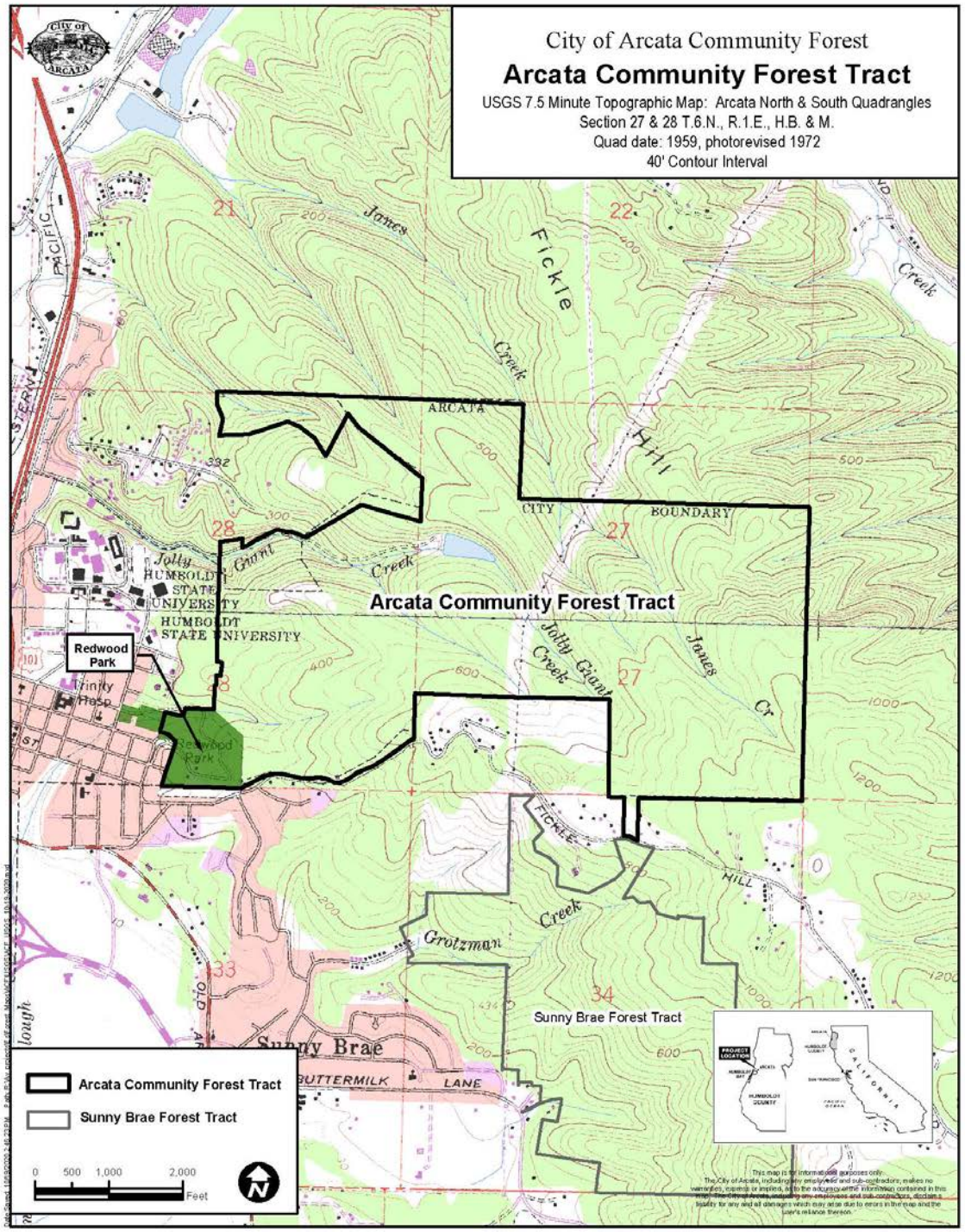
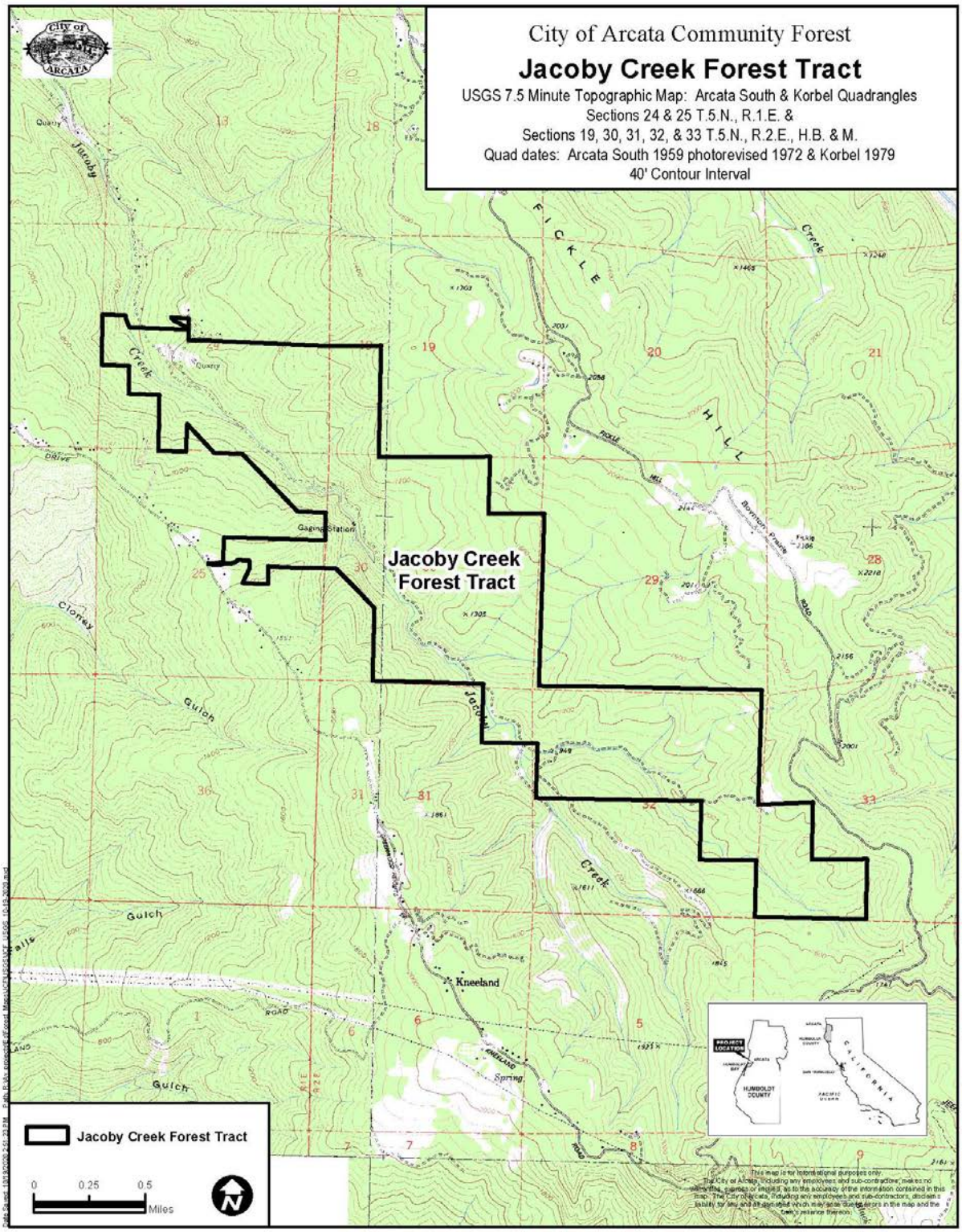
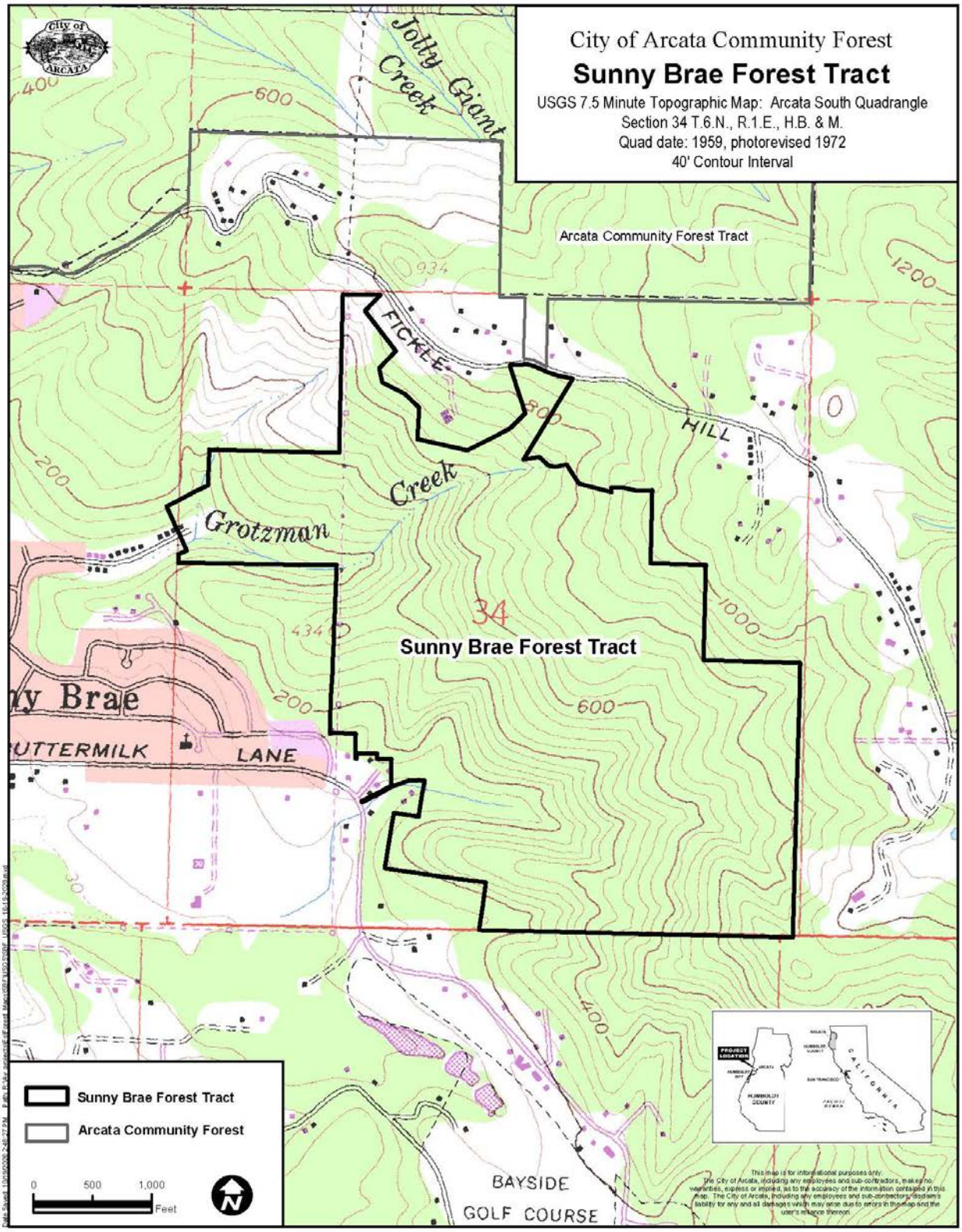


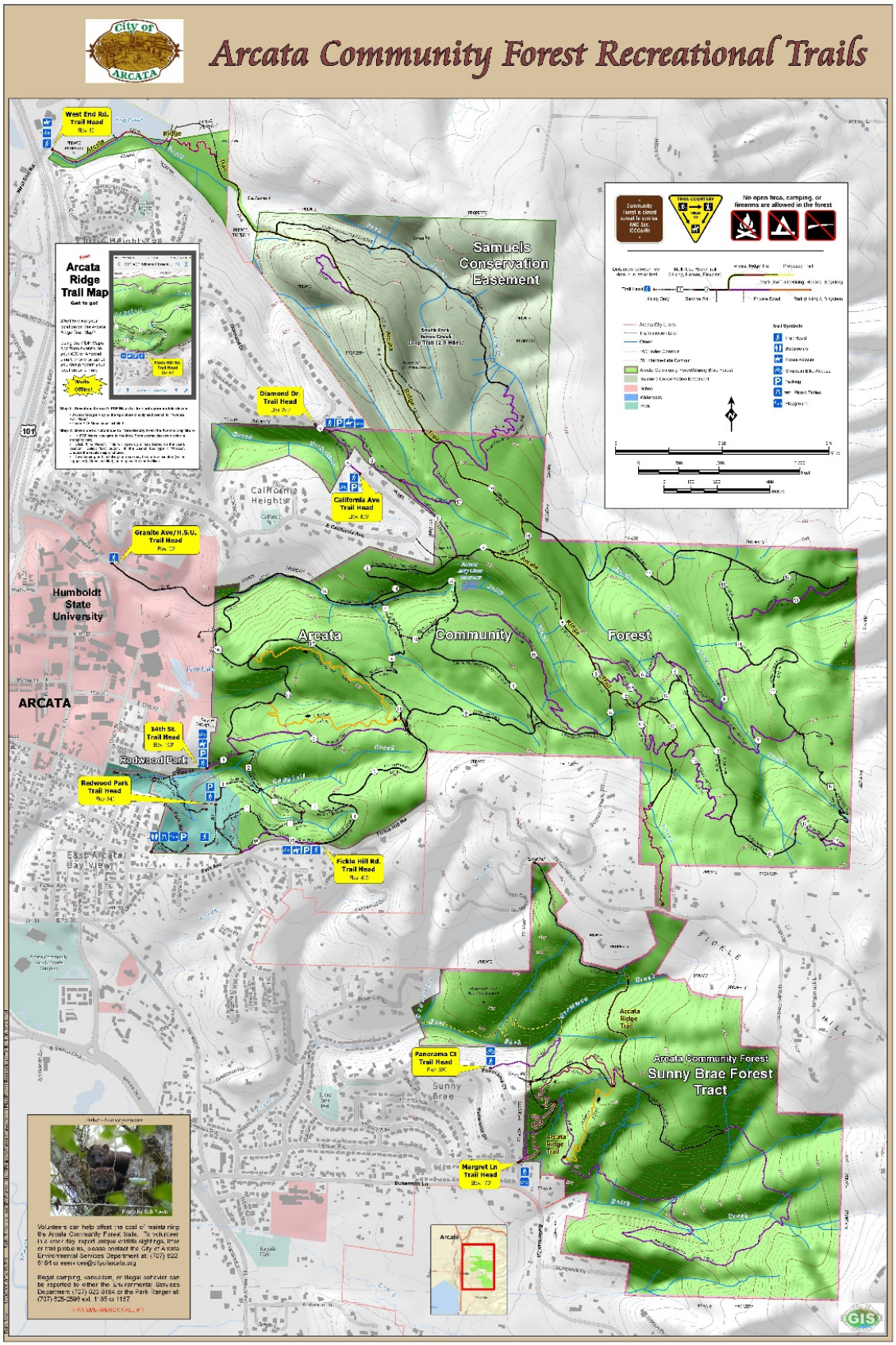
APPENDICES- Maps

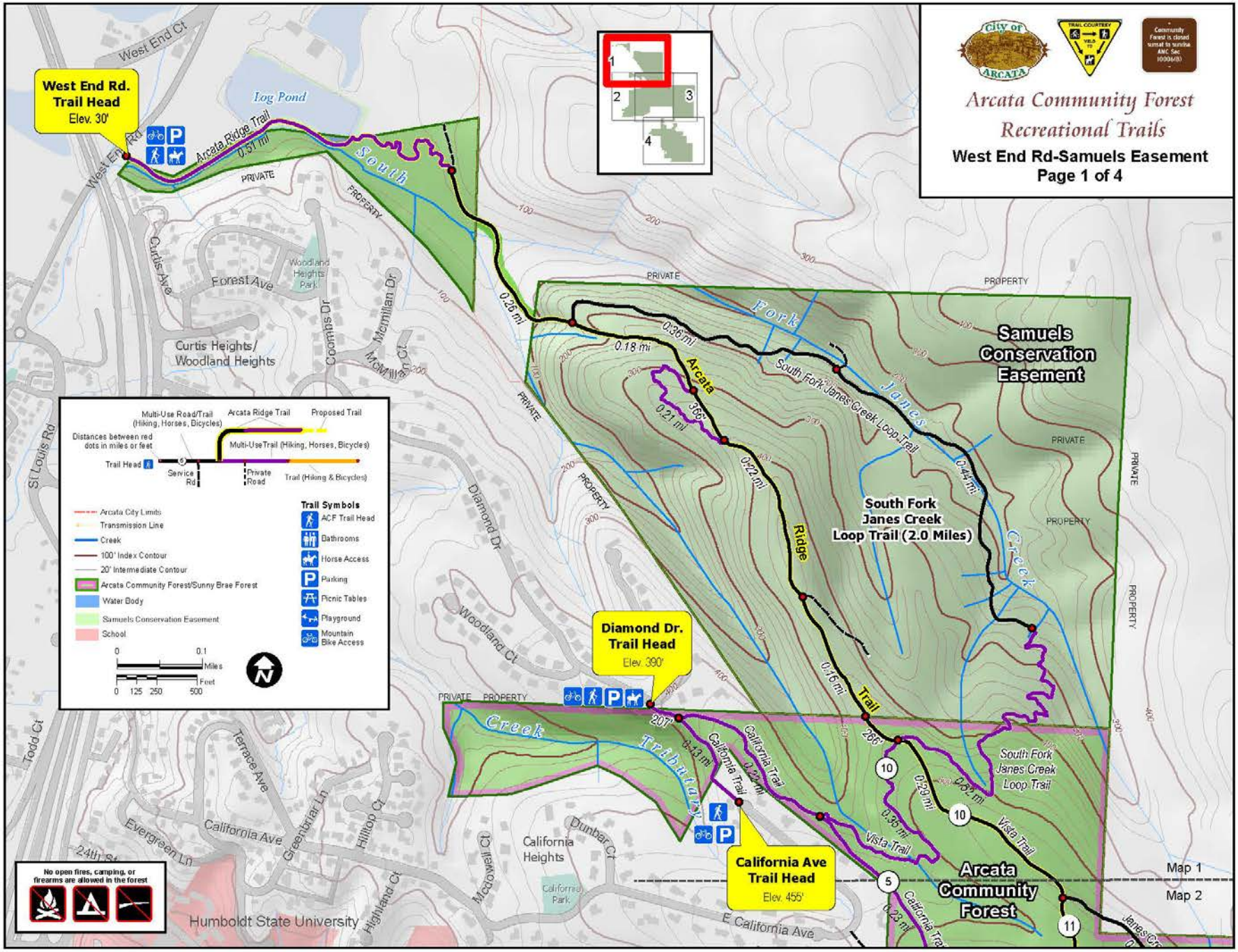


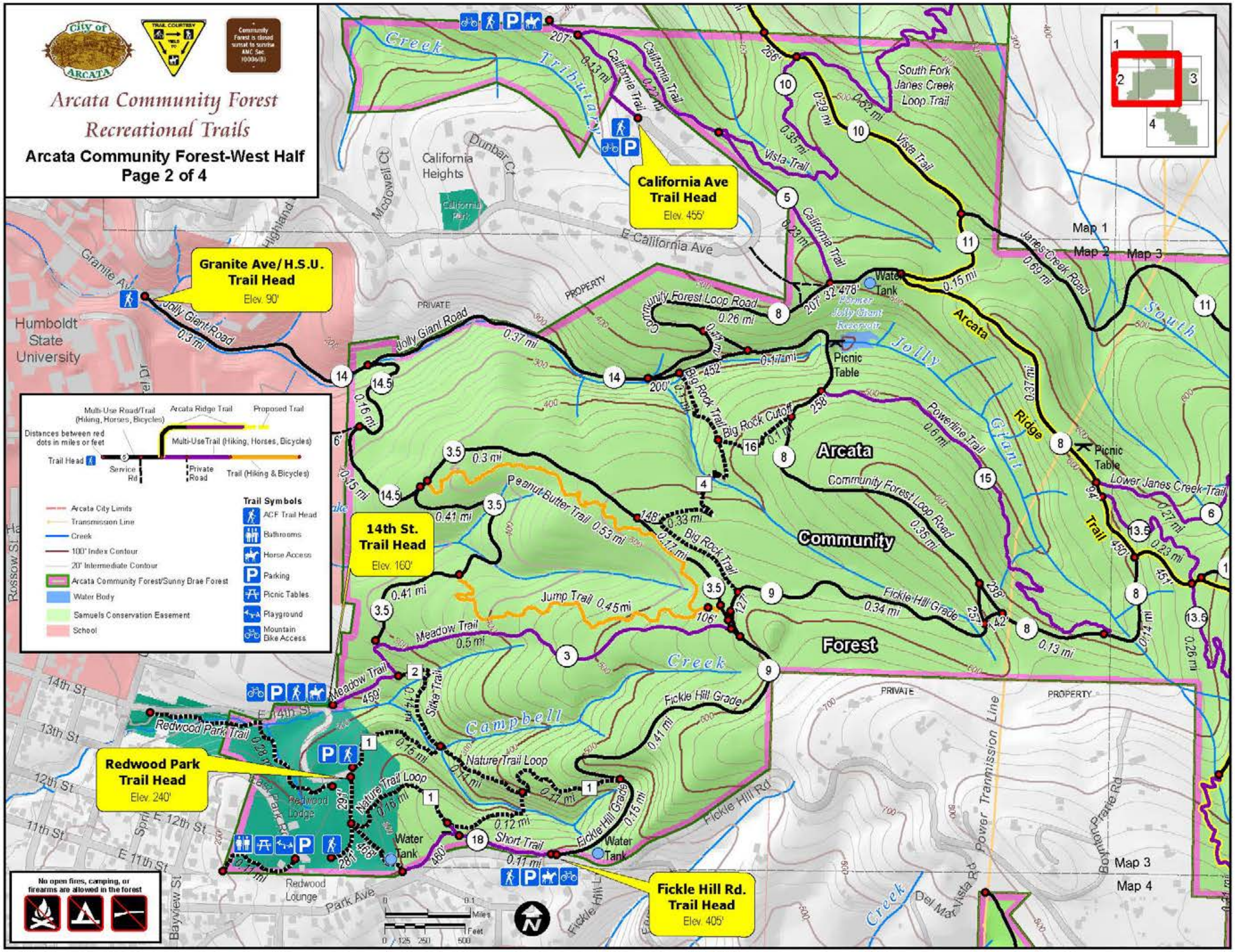

City of Arcata Community Forest
Jacoby Creek Forest Tract
USGS 7.5 Minute Topographic Map: Arcata South & Korbel Quadrangles
Sections 24 & 25 T.5.N., R.1.E. &
Sections 19, 30, 31, 32, & 33 T.5.N., R.2.E., H.B. & M.
Quad dates: Arcata South 1959 photorevised 1972 & Korbel 1979
40' Contour Interval
Jacoby Creek Forest Tract
Kneeland
Jacoby Creek Forest Tract
0 0.25 0.5 Miles
PROJECT LOCATION
HUMBOLDT COUNTY
CALIFORNIA

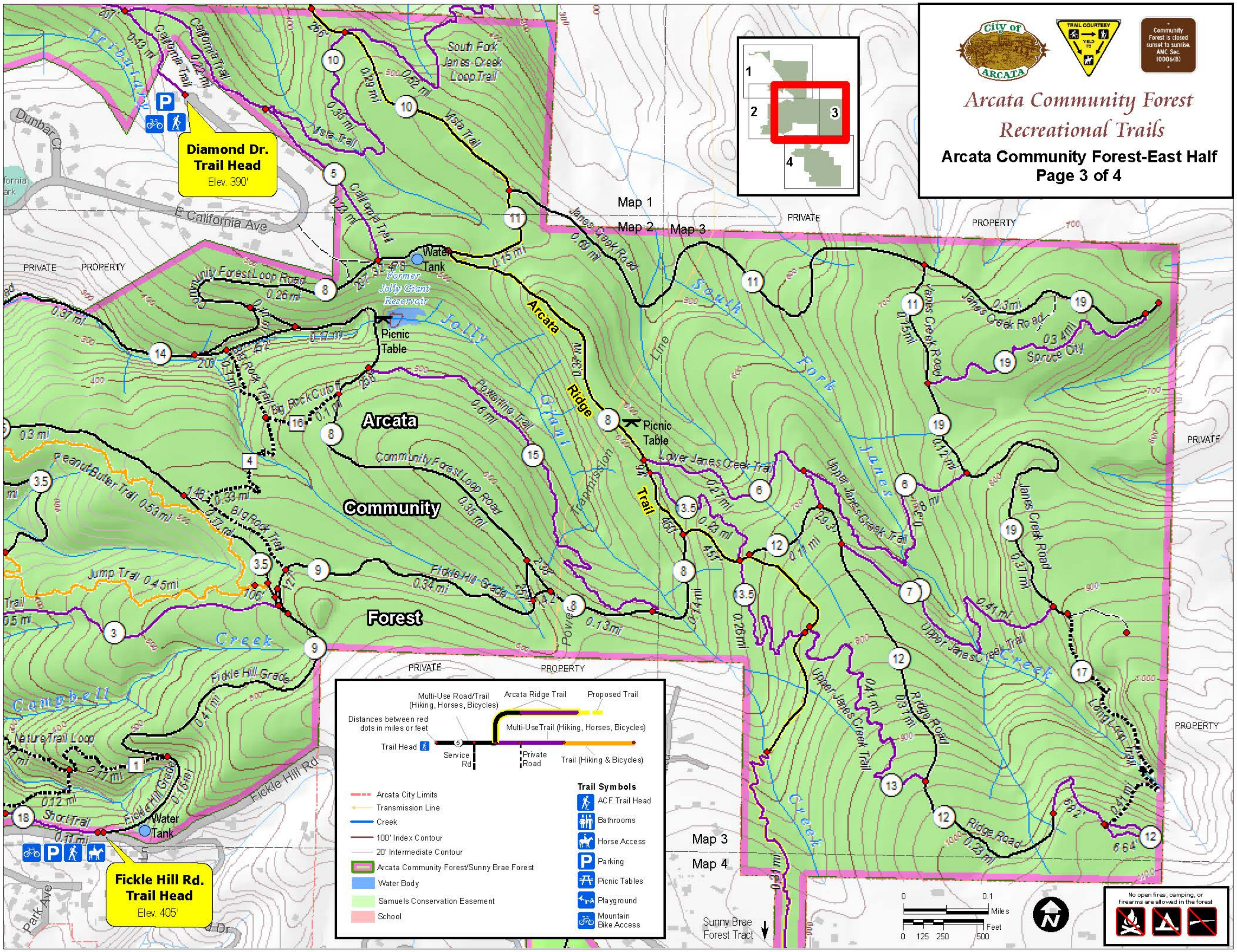

City of Arcata Community Forest
Sunny Brae Forest Tract
USGS 7.5 Minute Topographic Map: Arcata South Quadrangle
Section 34 T.6.N., R.1.E., H.B. & M.
Quad date: 1959, photorevised 1972
40' Contour Interval
Arcata Community Forest Tract
Jolly Giant Creek
FICKLE HILL
Grotzman Creek
34
Sunny Brae Forest Tract
BUTTERMILK LANE
BAYSIDE GOLF COURSE
Sunny Brae Forest Tract
Arcata Community Forest
0 500 1,000
Feet
PROJECT LOCATION
HUMBOLDT COUNTY
CALIFORNIA

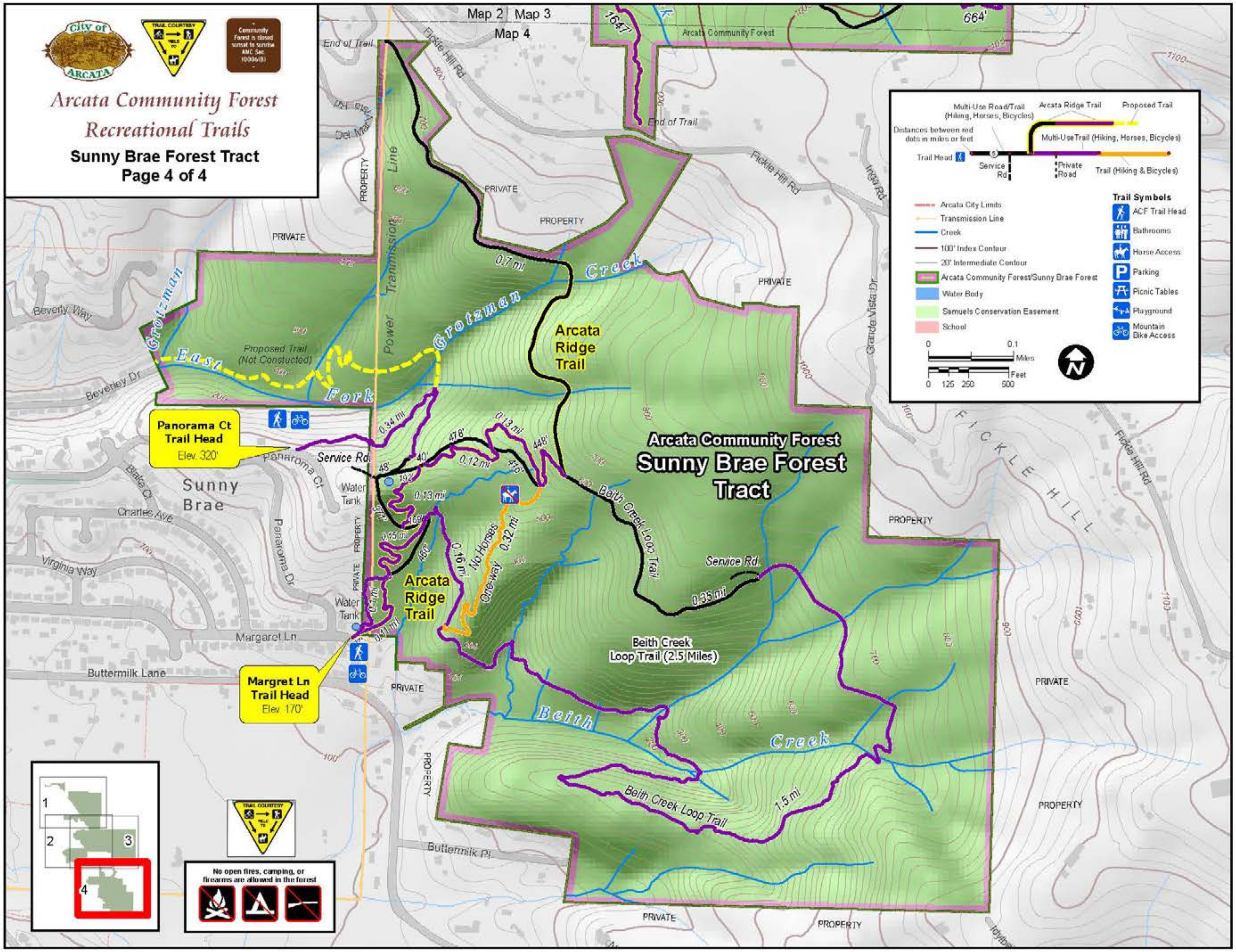
Existing Recreational Trails




City of Arcata
Arcata Community Forest
Recreational Trails
West End Rd-Samuels Easement
Page 1 of 4
West End Rd.
Trail Head
Elev. 30'
Log Pond
Arcata Ridge Trail
0.51 mi
South Fork
PRIVATE
PROPERTY
West End Ct
West End Rd
Curtis Ave
Forest Ave
Woodland Heights Park
Coombs Dr
McMillan Dr
McMillan Ct
Curtis Heights/
Woodland Heights
St Louis Rd
Diamond Dr
Woodland Ct
Todd Ct
Terrace Ave
Evergreen Ln
California Ave
Greenbriar Ln
Hilltop Ct
24th St
Highland Ct
Mcdowell Ct
California Heights
California Park
Dunbar Ct
E California Ave
Humboldt State University
0.25 mi
0.36 mi
0.18 mi
Arcata
0.21 mi
South Fork Janes Creek Loop Trail
Janes
Creek
Samuels
Conservation
Easement
0.44 mi
South Fork
Janes Creek
Loop Trail (2.0 Miles)
Ridge
Trail
0.16 mi
Diamond Dr.
Trail Head
Elev. 390'
207'
0.43 mi
California Trail
0.22 mi
266'
0.29 mi
0.61 mi
0.35 mi
Vista Trail
South Fork
Janes Creek
Loop Trail
California Ave
Trail Head
Elev. 455'
Arcata
Community
Forest
0.23 mi
Map 1
Map 2
Multi-Use Road/Trail (Hiking, Horses, Bicycles)
Arcata Ridge Trail
Proposed Trail
Distances between red dots in miles or feet
Trail Head
Service Rd
Private Road
Multi-UseTrail (Hiking, Horses, Bicycles)
Trail (Hiking & Bicycles)
Arcata City Limits
Transmission Line
Creek
100' Index Contour
20' Intermediate Contour
Arcata Community Forest/Sunny Brae Forest
Water Body
Samuels Conservation Easement
School
Miles
Feet
Trail Symbols
ACF Trail Head
Bathrooms
Horse Access
Parking
Picnic Tables
Playground
Mountain Bike Access
No open fires, camping, or firearms are allowed in the forest


Arcata Community Forest
Recreational Trails
Arcata Community Forest-West Half
Page 2 of 4
California Ave Trail Head
Elev. 455'
Granite Ave/H.S.U. Trail Head
Elev. 90'
14th St. Trail Head
Elev. 160'
Redwood Park Trail Head
Elev. 240'
Fickle Hill Rd. Trail Head
Elev. 405'
Humboldt State University
California Heights
Arcata Community Forest
South Fork Janes Creek Loop Trail
Vista Trail
California Trail
Jolly Giant Road
Community Forest Loop Road
Big Rock Trail
Big Rock Cutoff
Powerline Trail
Peanut Butter Trail 0.53 mi
Jump Trail 0.45mi
Meadow Trail
Fickle Hill Grade
Nature Trail Loop
Short Trail
Redwood Park Trail
Sitka Trail
Arcata Ridge Trail
Janes Creek Road
Lower Janes Creek Trail
Former Jolly Giant Reservoir
Picnic Table
Water Tank
PRIVATE PROPERTY
Power Transmission Line
Map 1
Map 2
Map 3
Map 4
Multi-Use Road/Trail (Hiking, Horses, Bicycles)
Arcata Ridge Trail
Proposed Trail
Distances between red dots in miles or feet
Multi-Use Trail (Hiking, Horses, Bicycles)
Trail Head
Service Rd
Private Road
Trail (Hiking & Bicycles)
Arcata City Limits
Transmission Line
Creek
100' Index Contour
20' Intermediate Contour
Arcata Community Forest/Sunny Brae Forest
Water Body
Samuels Conservation Easement
School
Trail Symbols
ACF Trail Head
Bathrooms
Horse Access
Parking
Picnic Tables
Playground
Mountain Bike Access
No open fires, camping, or firearms are allowed in the forest
Miles
Feet


City of Arcata
Arcata Community Forest Recreational Trails
Arcata Community Forest-East Half
Page 3 of 4
Community Forest is closed sunset to sunrise. AMC Sec. 10006(B)
Diamond Dr. Trail Head
Elev. 390'
Fickle Hill Rd. Trail Head
Elev. 405'
Arcata
Community
Forest
Arcata Ridge Trail
Map 1
Map 2
Map 3
Map 4
PRIVATE
PROPERTY
E California Ave
Dunbar Ct
Fickle Hill Rd
Park Ave
California Trail
Vista Trail
South Fork Janes Creek Loop Trail
Janes Creek Road
Community Forest Loop Road
Former Jolly Giant Reservoir
Water Tank
Picnic Table
Big Rock Trail
Big Rock Cutoff
Peanut Butter Trail
Jump Trail
Fickle Hill Grade
Nature Trail Loop
Short Trail
Lower Janes Creek Trail
Upper Janes Creek Trail
Ridge Road
Long Loop Trail
Spruce City
Transmission Line
Power Line
South Fork Janes Creek
Jolly Giant Creek
Campbell Creek
Sunny Brae Forest Tract
Multi-Use Road/Trail (Hiking, Horses, Bicycles)
Arcata Ridge Trail
Proposed Trail
Distances between red dots in miles or feet
Multi-Use Trail (Hiking, Horses, Bicycles)
Trail Head
Service Rd
Private Road
Trail (Hiking & Bicycles)
Arcata City Limits
Transmission Line
Creek
100' Index Contour
20' Intermediate Contour
Arcata Community Forest/Sunny Brae Forest
Water Body
Samuels Conservation Easement
School
Trail Symbols
ACF Trail Head
Bathrooms
Horse Access
Parking
Picnic Tables
Playground
Mountain Bike Access
Miles
Feet
No open fires, camping, or firearms are allowed in the forest


Arcata Community Forest
Recreational Trails
Sunny Brae Forest Tract
Page 4 of 4
Map 2
Map 3
Map 4
Arcata Ridge Trail
Arcata Community Forest
Sunny Brae Forest Tract
Panorama Ct Trail Head
Elev. 320'
Margret Ln Trail Head
Elev. 170'
Beith Creek Loop Trail (2.5 Miles)
Beith Creek Loop Trail
Proposed Trail (Not Constructed)
Grotzman Creek
East Fork
Beith Creek
Power Transmission Line
Service Rd.
Water Tank
No Horses
One-way
Sunny Brae
Fickle Hill Rd
Fickle Hill
Panorama Ct
Panorama Dr
Margaret Ln
Buttermilk Lane
Buttermilk Pl
Beverley Dr
Charles Ave
Virginia Way
Grande Vista Dr
PRIVATE
PROPERTY
Multi-Use Road/Trail (Hiking, Horses, Bicycles)
Arcata Ridge Trail
Proposed Trail
Distances between red dots in miles or feet
Multi-Use Trail (Hiking, Horses, Bicycles)
Trail Head
Service Rd
Private Road
Trail (Hiking & Bicycles)
Arcata City Limits
Transmission Line
Creek
100' Index Contour
20' Intermediate Contour
Arcata Community Forest/Sunny Brae Forest
Water Body
Samuels Conservation Easement
School
Trail Symbols
ACF Trail Head
Bathrooms
Horse Access
Parking
Picnic Tables
Playground
Mountain Bike Access
Miles
Feet
No open fires, camping, or firearms are allowed in the forest

Arcata South Quad

Print

CNDDB Quad Species List 66 records.

Element Type	Scientific Name	Common Name	Element Code	Federal Status	State Status	CDFW Status	CA Rare Plant Rank	Quad Code	Quad Name	Data Status	Taxonomic Sort
Animals - Amphibians	Ascaphus truei	Pacific tailed frog	AAABA01010	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Amphibians - Ascaphidae - Ascaphus truei
Animals - Amphibians	Rana aurora	northern red-legged frog	AAABH01021	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Amphibians - Ranidae - Rana aurora
Animals - Amphibians	Rana boylii	foothill yellow-legged frog	AAABH01050	None	Endangered	SSC	-	4012471	ARCATA SOUTH	Mapped	Animals - Amphibians - Ranidae - Rana boylii
Animals - Amphibians	Rhyacotriton variegatus	southern torrent salamander	AAAAJ01020	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Amphibians - Rhyacotritonidae - Rhyacotriton variegatus
Animals - Birds	Elanus leucurus	white-tailed kite	ABNKC06010	None	None	FP	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Birds - Accipitridae - Elanus leucurus
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Birds - Ardeidae - Ardea herodias
Animals - Birds	Botaurus lentiginosus	American bittern	ABNGA01020	None	None	-	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Birds - Ardeidae - Botaurus lentiginosus
Animals - Birds	Nycticorax nycticorax	black-crowned night heron	ABNGA11010	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Birds - Ardeidae - Nycticorax nycticorax
Animals - Birds	Charadrius montanus	mountain plover	ABNNB03100	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped	Animals - Birds - Charadriidae -

											Charadrius montanus
Animals - Birds	Falco peregrinus anatum	American peregrine falcon	ABNKD06071	Delisted	Delisted	FP	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Birds - Falconidae - Falco peregrinus anatum
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Birds - Pandionidae - Pandion haliaetus
Animals - Birds	Passerculus sandwichensis alaudinus	Bryant's savannah sparrow	ABPBX99011	None	None	SSC	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Birds - Passerellidae - Passerculus sandwichensis alaudinus
Animals - Birds	Pelecanus occidentalis californicus	California brown pelican	ABNFC01021	Delisted	Delisted	FP	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Birds - Pelecanidae - Pelecanus occidentalis californicus
Animals - Birds	Phalacrocorax auritus	double-crested cormorant	ABNFD01020	None	None	WL	-	4012471	ARCATA SOUTH	Mapped	Animals - Birds - Phalacrocoracidae - Phalacrocorax auritus
Animals - Birds	Coturnicops noveboracensis	yellow rail	ABNME01010	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Birds - Rallidae - Coturnicops noveboracensis
Animals - Birds	Numenius americanus	long-billed curlew	ABNNF07070	None	None	WL	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Birds - Scolopacidae - Numenius americanus
Animals - Birds	Strix occidentalis caurina	Northern Spotted Owl	ABNSB12011	Threatened	Threatened	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Birds - Strigidae - Strix occidentalis caurina
Animals - Fish	Acipenser medirostris	green sturgeon	AFCAA01030	Threatened	None	SSC	-	4012471	ARCATA SOUTH	Mapped	Animals - Fish - Acipenseridae - Acipenser medirostris

Animals - Fish	Eucyclogobius newberryi	tidewater goby	AFCQN04010	Endangered	None	-	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Fish - Gobiidae - Eucyclogobius newberryi
Animals - Fish	Spirinchus thaleichthys	longfin smelt	AFCHB03010	Candidate	Threatened	-	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Fish - Osmeridae - Spirinchus thaleichthys
Animals - Fish	Thaleichthys pacificus	eulachon	AFCHB04010	Threatened	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Fish - Osmeridae - Thaleichthys pacificus
Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Lampetra richardsoni	western brook lamprey	AFBAA02090	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped	Animals - Fish - Petromyzontidae - Lampetra richardsoni
Animals - Fish	Oncorhynchus clarkii clarkii	coast cutthroat trout	AFCHA0208A	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus clarkii clarkii
Animals - Fish	Oncorhynchus kisutch pop. 2	coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	-	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus kisutch pop. 2
Animals - Fish	Oncorhynchus mykiss irideus pop. 16	steelhead - northern California DPS	AFCHA0209Q	Threatened	None	-	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 16
Animals - Fish	Oncorhynchus tshawytscha pop. 17	chinook salmon - California coastal ESU	AFCHA0205S	Threatened	None	-	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 17

Animals - Insects	Bombus caliginosus	obscure bumble bee	IIHYM24380	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Insects - Apidae - Bombus caliginosus
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	Candidate Endangered	-	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Insects - Apidae - Bombus occidentalis
Animals - Insects	Cicindela hirticollis gravida	sandy beach tiger beetle	IICOL02101	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Insects - Carabidae - Cicindela hirticollis gravida
Animals - Insects	Scaphinotus behrensi	Behrens' snail-eating beetle	IICOL4L070	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Insects - Carabidae - Scaphinotus behrensi
Animals - Mammals	Aplodontia rufa humboldtiana	Humboldt mountain beaver	AMAFA01017	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Mammals - Aplodontiidae - Aplodontia rufa humboldtiana
Animals - Mammals	Erethizon dorsatum	North American porcupine	AMAFJ01010	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Mammals - Erethizontidae - Erethizon dorsatum
Animals - Mammals	Arborimus pomo	Sonoma tree vole	AMAFF23030	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Mammals - Muridae - Arborimus pomo
Animals - Mammals	Pekania pennanti	Fisher	AMAJF01020	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Mammals - Mustelidae - Pekania pennanti
Animals - Mammals	Corynorhinus townsendii	Townsend's big-eared bat	AMACC08010	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped	Animals - Mammals - Vespertilionidae - Corynorhinus townsendii
Animals -	Lasiurus	hoary bat	AMACC05030	None	None	-	-	4012471	ARCATA	Unprocessed	Animals -

Mammals	cinereus								SOUTH		Mammals - Vespertilionidae - Lasiurus cinereus
Animals - Mammals	Myotis evotis	long-eared myotis	AMACC01070	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Animals - Mammals - Vespertilionidae - Myotis evotis
Animals - Mollusks	Margaritifera falcata	western pearlshell	IMBIV27020	None	None	-	-	4012471	ARCATA SOUTH	Unprocessed	Animals - Mollusks - Margaritiferidae - Margaritifera falcata
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	4012471	ARCATA SOUTH	Mapped and Unprocessed	Animals - Reptiles - Emydidae - Emys marmorata
Community - Terrestrial	Northern Coastal Salt Marsh	Northern Coastal Salt Marsh	CTT52110CA	None	None	-	-	4012471	ARCATA SOUTH	Mapped	Community - Terrestrial - Northern Coastal Salt Marsh
Plants - Bryophytes	Fissidens pauperculus	minute pocket moss	NBMUS2W0U0	None	None	-	1B.2	4012471	ARCATA SOUTH	Mapped	Plants - Bryophytes - Fissidentaceae - Fissidens pauperculus
Plants - Lichens	Usnea longissima	Methuselah's beard lichen	NLLEC5P420	None	None	-	4.2	4012471	ARCATA SOUTH	Mapped	Plants - Lichens - Parmeliaceae - Usnea longissima
Plants - Vascular	Angelica lucida	sea-watch	PDAPI070G0	None	None	-	4.2	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Apiaceae - Angelica lucida
Plants - Vascular	Cardamine angulata	seaside bittercress	PDBRA0K010	None	None	-	2B.1	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Brassicaceae - Cardamine angulata
Plants - Vascular	Spergularia canadensis var. occidentalis	western sand-spurrey	PDCAR0W032	None	None	-	2B.1	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Caryophyllaceae - Spergularia canadensis var. occidentalis

Plants - Vascular	Carex lyngbyei	Lyngbye's sedge	PMCYP037Y0	None	None	-	2B.2	4012471	ARCATA SOUTH	Mapped and Unprocessed	Plants - Vascular - Cyperaceae - Carex lyngbyei
Plants - Vascular	Carex praticola	northern meadow sedge	PMCYP03B20	None	None	-	2B.2	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Cyperaceae - Carex praticola
Plants - Vascular	Eleocharis parvula	small spikerush	PMCYP091G0	None	None	-	4.3	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Cyperaceae - Eleocharis parvula
Plants - Vascular	Hosackia gracilis	harlequin lotus	PDFAB2A0D0	None	None	-	4.2	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Fabaceae - Hosackia gracilis
Plants - Vascular	Lathyrus glandulosus	sticky pea	PDFAB251A0	None	None	-	4.3	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Fabaceae - Lathyrus glandulosus
Plants - Vascular	Lathyrus japonicus	seaside pea	PDFAB250C0	None	None	-	2B.1	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Fabaceae - Lathyrus japonicus
Plants - Vascular	Ribes laxiflorum	trailing black currant	PDGRO020V0	None	None	-	4.3	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Grossulariaceae - Ribes laxiflorum
Plants - Vascular	Lilium kelloggii	Kellogg's lily	PMLIL1A0A0	None	None	-	4.3	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Liliaceae - Lilium kelloggii
Plants - Vascular	Lilium occidentale	western lily	PMLIL1A0G0	Endangered	Endangered	-	1B.1	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Liliaceae - Lilium occidentale
Plants - Vascular	Lycopodium clavatum	running-pine	PPLYC01080	None	None	-	4.1	4012471	ARCATA SOUTH	Mapped and Unprocessed	Plants - Vascular - Lycopodiaceae - Lycopodium clavatum
Plants - Vascular	Sidalcea malachroides	maple-leaved checkerbloom	PDMAL110E0	None	None	-	4.2	4012471	ARCATA SOUTH	Mapped and Unprocessed	Plants - Vascular - Malvaceae - Sidalcea malachroides
Plants -	Monotropa	ghost-pipe	PDMON03030	None	None	-	2B.2	4012471	ARCATA	Mapped	Plants - Vascular -

Vascular	uniflora								SOUTH		Monotropaceae - Monotropa uniflora
Plants - Vascular	Montia howellii	Howell's montia	PDPOR05070	None	None	-	2B.2	4012471	ARCATA SOUTH	Mapped and Unprocessed	Plants - Vascular - Montiaceae - Montia howellii
Plants - Vascular	Listera cordata	heart-leaved twayblade	PMORC1N060	None	None	-	4.2	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Orchidaceae - Listera cordata
Plants - Vascular	Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	PDSCR0D402	None	None	-	1B.2	4012471	ARCATA SOUTH	Mapped and Unprocessed	Plants - Vascular - Orobanchaceae - Castilleja ambigua var. humboldtiensis
Plants - Vascular	Chloropyron maritimum ssp. palustre	Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	-	1B.2	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Orobanchaceae - Chloropyron maritimum ssp. palustre
Plants - Vascular	Pleuropogon refractus	nodding semaphore grass	PMPOA4Y080	None	None	-	4.2	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Poaceae - Pleuropogon refractus
Plants - Vascular	Chrysosplenium glechomifolium	Pacific golden saxifrage	PDSAX07020	None	None	-	4.3	4012471	ARCATA SOUTH	Unprocessed	Plants - Vascular - Saxifragaceae - Chrysosplenium glechomifolium
Plants - Vascular	Mitellastra caulescens	leafy-stemmed mitrewort	PDSAX0N020	None	None	-	4.2	4012471	ARCATA SOUTH	Mapped and Unprocessed	Plants - Vascular - Saxifragaceae - Mitellastra caulescens
Plants - Vascular	Viola palustris	alpine marsh violet	PDVIO041G0	None	None	-	2B.2	4012471	ARCATA SOUTH	Mapped	Plants - Vascular - Violaceae - Viola palustris

Korbel Quad

Print

CNDDB Quad Species List 57 records.

Element Type	Scientific Name	Common Name	Element Code	Federal Status	State Status	CDFW Status	CA Rare Plant Rank	Quad Code	Quad Name	Data Status	Taxonomic Sort
Animals - Amphibians	Ascaphus truei	Pacific tailed frog	AAABA01010	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Amphibians - Ascaphidae - Ascaphus truei
Animals - Amphibians	Plethodon elongatus	Del Norte salamander	AAAAD12050	None	None	WL	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Amphibians - Plethodontidae - Plethodon elongatus
Animals - Amphibians	Rana aurora	northern red-legged frog	AAABH01021	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Amphibians - Ranidae - Rana aurora
Animals - Amphibians	Rana boylii	foothill yellow-legged frog	AAABH01050	None	Endangered	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Amphibians - Ranidae - Rana boylii
Animals - Amphibians	Rhyacotriton variegatus	southern torrent salamander	AAAAJ01020	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Amphibians - Rhyacotritonidae - Rhyacotriton variegatus
Animals - Birds	Accipiter cooperii	Cooper's hawk	ABNKC12040	None	None	WL	-	4012378	KORBEL	Mapped	Animals - Birds - Accipitridae - Accipiter cooperii
Animals - Birds	Haliaeetus leucocephalus	bald eagle	ABNKC10010	Delisted	Endangered	FP	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Birds - Accipitridae - Haliaeetus leucocephalus
Animals - Birds	Ardea herodias	great blue heron	ABNGA04010	None	None	-	-	4012378	KORBEL	Unprocessed	Animals - Birds - Ardeidae - Ardea herodias

Animals - Birds	Nycticorax nycticorax	black-crowned night heron	ABNGA11010	None	None	-	-	4012378	KORBEL	Unprocessed	Animals - Birds - Ardeidae - Nycticorax nycticorax
Animals - Birds	Falco peregrinus anatum	American peregrine falcon	ABNKD06071	Delisted	Delisted	FP	-	4012378	KORBEL	Unprocessed	Animals - Birds - Falconidae - Falco peregrinus anatum
Animals - Birds	Riparia riparia	bank swallow	ABPAU08010	None	Threatened	-	-	4012378	KORBEL	Mapped	Animals - Birds - Hirundinidae - Riparia riparia
Animals - Birds	Icteria virens	yellow-breasted chat	ABPBX24010	None	None	SSC	-	4012378	KORBEL	Unprocessed	Animals - Birds - Icteriidae - Icteria virens
Animals - Birds	Pandion haliaetus	osprey	ABNKC01010	None	None	WL	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Birds - Pandionidae - Pandion haliaetus
Animals - Birds	Poecile atricapillus	black-capped chickadee	ABPAW01010	None	None	WL	-	4012378	KORBEL	Unprocessed	Animals - Birds - Paridae - Poecile atricapillus
Animals - Birds	Phalacrocorax auritus	double-crested cormorant	ABNFD01020	None	None	WL	-	4012378	KORBEL	Unprocessed	Animals - Birds - Phalacrocoracidae - Phalacrocorax auritus
Animals - Birds	Strix occidentalis caurina	Northern Spotted Owl	ABNSB12011	Threatened	Threatened	-	-	4012378	KORBEL	Mapped	Animals - Birds - Strigidae - Strix occidentalis caurina
Animals - Birds	Empidonax traillii	willow flycatcher	ABPAE33040	None	Endangered	-	-	4012378	KORBEL	Unprocessed	Animals - Birds - Tyrannidae - Empidonax traillii
Animals - Fish	Acipenser medirostris	green sturgeon	AFCAA01030	Threatened	None	SSC	-	4012378	KORBEL	Unprocessed	Animals - Fish - Acipenseridae - Acipenser medirostris
Animals - Fish	Thaleichthys pacificus	eulachon	AFCHB04010	Threatened	None	-	-	4012378	KORBEL	Mapped	Animals - Fish - Osmeridae - Thaleichthys pacificus

Animals - Fish	Entosphenus tridentatus	Pacific lamprey	AFBAA02100	None	None	SSC	-	4012378	KORBEL	Unprocessed	Animals - Fish - Petromyzontidae - Entosphenus tridentatus
Animals - Fish	Lampetra richardsoni	western brook lamprey	AFBAA02090	None	None	SSC	-	4012378	KORBEL	Unprocessed	Animals - Fish - Petromyzontidae - Lampetra richardsoni
Animals - Fish	Oncorhynchus clarkii clarkii	coast cutthroat trout	AFCHA0208A	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus clarkii clarkii
Animals - Fish	Oncorhynchus kisutch pop. 2	coho salmon - southern Oregon / northern California ESU	AFCHA02032	Threatened	Threatened	-	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus kisutch pop. 2
Animals - Fish	Oncorhynchus mykiss irideus pop. 16	steelhead - northern California DPS	AFCHA0209Q	Threatened	None	-	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 16
Animals - Fish	Oncorhynchus mykiss irideus pop. 36	summer-run steelhead trout	AFCHA0213B	None	Candidate Endangered	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus mykiss irideus pop. 36
Animals - Fish	Oncorhynchus tshawytscha pop. 17	chinook salmon - California coastal ESU	AFCHA0205S	Threatened	None	-	-	4012378	KORBEL	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 17
Animals - Fish	Oncorhynchus tshawytscha pop. 30	chinook salmon - upper Klamath and Trinity Rivers ESU	AFCHA02056	Candidate	Candidate Endangered	SSC	-	4012378	KORBEL	Unprocessed	Animals - Fish - Salmonidae - Oncorhynchus tshawytscha pop. 30

Animals - Insects	Bombus caliginosus	obscure bumble bee	IIHYM24380	None	None	-	-	4012378	KORBEL	Mapped	Animals - Insects - Apidae - Bombus caliginosus
Animals - Insects	Bombus occidentalis	western bumble bee	IIHYM24250	None	Candidate Endangered	-	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Insects - Apidae - Bombus occidentalis
Animals - Mammals	Aplodontia rufa humboldtiana	Humboldt mountain beaver	AMAFA01017	None	None	-	-	4012378	KORBEL	Mapped	Animals - Mammals - Aplodontiidae - Aplodontia rufa humboldtiana
Animals - Mammals	Erethizon dorsatum	North American porcupine	AMAFJ01010	None	None	-	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Mammals - Erethizontidae - Erethizon dorsatum
Animals - Mammals	Arborimus albipes	white-footed vole	AMAFF23010	None	None	SSC	-	4012378	KORBEL	Mapped	Animals - Mammals - Muridae - Arborimus albipes
Animals - Mammals	Arborimus pomo	Sonoma tree vole	AMAFF23030	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Mammals - Muridae - Arborimus pomo
Animals - Mammals	Pekania pennanti	Fisher	AMAJF01020	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Mammals - Mustelidae - Pekania pennanti
Animals - Mammals	Corynorhinus townsendii	Townsend's big-eared bat	AMACC08010	None	None	SSC	-	4012378	KORBEL	Mapped	Animals - Mammals - Vespertilionidae - Corynorhinus townsendii
Animals - Reptiles	Emys marmorata	western pond turtle	ARAAD02030	None	None	SSC	-	4012378	KORBEL	Mapped and Unprocessed	Animals - Reptiles -

											Emydidae - Emys marmorata
Plants - Lichens	Usnea longissima	Methuselah's beard lichen	NLLEC5P420	None	None	-	4.2	4012378	KORBEL	Mapped and Unprocessed	Plants - Lichens - Parmeliaceae - Usnea longissima
Plants - Vascular	Hemizonia congesta ssp. tracyi	Tracy's tarplant	PDAST4R067	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Asteraceae - Hemizonia congesta ssp. tracyi
Plants - Vascular	Hosackia gracilis	harlequin lotus	PDFAB2A0D0	None	None	-	4.2	4012378	KORBEL	Unprocessed	Plants - Vascular - Fabaceae - Hosackia gracilis
Plants - Vascular	Lathyrus glandulosus	sticky pea	PDFAB251A0	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Fabaceae - Lathyrus glandulosus
Plants - Vascular	Ribes laxiflorum	trailing black currant	PDGRO020V0	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Grossulariaceae - Ribes laxiflorum
Plants - Vascular	Erythronium revolutum	coast fawn lily	PMLIL0U0F0	None	None	-	2B.2	4012378	KORBEL	Mapped and Unprocessed	Plants - Vascular - Liliaceae - Erythronium revolutum
Plants - Vascular	Fritillaria purdyi	Purdy's fritillary	PMLIL0V0H0	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Liliaceae - Fritillaria purdyi
Plants - Vascular	Lilium kelloggii	Kellogg's lily	PMLIL1A0A0	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Liliaceae - Lilium kelloggii
Plants - Vascular	Lycopodium clavatum	running-pine	PPLYC01080	None	None	-	4.1	4012378	KORBEL	Mapped and Unprocessed	Plants - Vascular - Lycopodiaceae - Lycopodium clavatum
Plants - Vascular	Iliamna latibracteata	California globe mallow	PDMAL0K040	None	None	-	1B.2	4012378	KORBEL	Mapped	Plants - Vascular - Malvaceae - Iliamna latibracteata
Plants -	Sidalcea	maple-leaved	PDMAL110E0	None	None	-	4.2	4012378	KORBEL	Mapped and	Plants - Vascular -

Vascular	malachroides	checkerbloom								Unprocessed	Malvaceae - Sidalcea malachroides
Plants - Vascular	Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	PDMAL110F9	None	None	-	1B.2	4012378	KORBEL	Mapped and Unprocessed	Plants - Vascular - Malvaceae - Sidalcea malviflora ssp. patula
Plants - Vascular	Pityopus californicus	California pinefoot	PDMON05010	None	None	-	4.2	4012378	KORBEL	Unprocessed	Plants - Vascular - Monotropaceae - Pityopus californicus
Plants - Vascular	Montia howellii	Howell's montia	PDPOR05070	None	None	-	2B.2	4012378	KORBEL	Mapped and Unprocessed	Plants - Vascular - Montiaceae - Montia howellii
Plants - Vascular	Epilobium septentrionale	Humboldt County fuchsia	PDONA06110	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Onagraceae - Epilobium septentrionale
Plants - Vascular	Listera cordata	heart-leaved twayblade	PMORC1N060	None	None	-	4.2	4012378	KORBEL	Unprocessed	Plants - Vascular - Orchidaceae - Listera cordata
Plants - Vascular	Pleuropogon refractus	nodding semaphore grass	PMPOA4Y080	None	None	-	4.2	4012378	KORBEL	Unprocessed	Plants - Vascular - Poaceae - Pleuropogon refractus
Plants - Vascular	Coptis laciniata	Oregon goldthread	PDRAN0A020	None	None	-	4.2	4012378	KORBEL	Unprocessed	Plants - Vascular - Ranunculaceae - Coptis laciniata
Plants - Vascular	Chrysosplenium glechomifolium	Pacific golden saxifrage	PDSAX07020	None	None	-	4.3	4012378	KORBEL	Unprocessed	Plants - Vascular - Saxifragaceae - Chrysosplenium glechomifolium
Plants - Vascular	Mitellastra caulescens	leafy-stemmed mitrewort	PDSAX0N020	None	None	-	4.2	4012378	KORBEL	Mapped and Unprocessed	Plants - Vascular - Saxifragaceae - Mitellastra caulescens
Plants - Vascular	Tiarella trifoliata var. trifoliata	trifoliate laceflower	PDSAX10031	None	None	-	3.2	4012378	KORBEL	Unprocessed	Plants - Vascular - Saxifragaceae - Tiarella trifoliata var. trifoliata