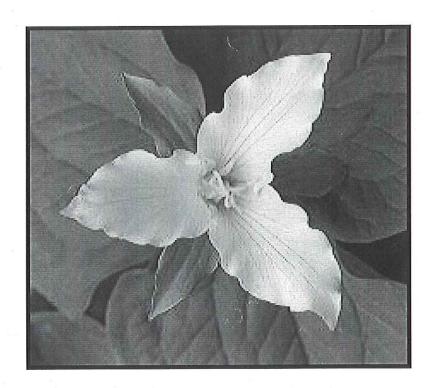
Humboldt State University Educational Vegetation Proposal



Prepared by

Lindsey Kufta-Christie Andrew Grewer Japer Peach

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Introduction

Problem Statement: Humboldt State University lacks landscape that is conducive in enhancing the interactive educational environment of the student body.

Background: Humboldt State University is located in Arcata, a coastal community that is situated in the temperate rainforest of Northern California, near the Humboldt Bay and coastal wetlands. HSU has a large array of disciplines, most of which focus on the biological sciences, such as Natural Resources Planning Interpretation, Wildlife, Zoology, Botany, Forestry, Soils, Geology, etc. All of these majors call for student involvement in the immediate environment of the campus to further their knowledge of classroom concepts. Some of these educational opportunities are available both on and off campus including the Campus Center for Appropriate Technology, L.W. Schatz Tree Farm, Schatz Energy Lab, Fish Hatchery, Telonicher Marine Lab, Coral Sea Research Vessel, Wildlife Museum, Marine Wildlife Care Facility, Vascular Plant Herbarium, Vertebrate Museum and local resources such as the Arcata Community Forest to aid in the learning experience of the students.

In 1982, a Landscape Master Plan was developed by Gallagher, which addressed the problem, among many others, of not having vegetation on campus that provides a sound education experience. Very few of the studies recommendations have been implemented since the study was published. The dilemma still remains at the University of whether or not to place energy into educational value of vegetation landscapes. There is a need for the demonstration of natural diversity of native plant species and their ecological ties to their habitat. This lack of implementation may be a result of the lack of integration between the working entities that mange the campus grounds and the educational institution. Although the science foundation is exhibited through the substantial amount of disciplines offered at Humboldt State, the university falls short in providing hands on spaces for educational freedom. By redesigning the campus with native species of this bioregion, and species of educational value, disciplines could benefit greatly, enhancing the interactive educational environment at Humboldt State Any information whent doing this on University.

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Goals and Objectives

GOALS:

- 1. Promote the creation and development of campus educational zones.
- 2. Make the campus landscape more educational by establishing plants that are native, endemic, and non-native (but not invasive).
 - 3. Submit a plant species list to Doug Koketch of Plant Operations to aid in his vegetation choices on campus.

OBJECTIVES:

- 1. Provide a survey to all the professors in Biological Sciences regarding which species would be applicable to the HSU landscape for educational purposes.
- 2. Evaluate sites on campus regarding composition of plant species and designate areas that would be useful as areas that are native, non-native, and a mix between the two. These areas will mainly be located near buildings that would directly benefit from outdoor examples (i.e. Science A, B, and C).

Alternatives

NO ACTION: A no action plan would perpetuate the current campus vegetation condition. These conditions are unfavorable to the outdoor educational experience and do very little to the students learning experience. Non-native hot zones would continue to exist providing a model of homogenous landscapes lacking diversity and native species. Many teachers on campus would lack the space or examples to thoroughly disseminate information due to the lack of real life specimens on the HSU campus. HSU Plan-Ops may continue their plan of minimal removal and restoration by both employees and students. Many species on campus are non-native and invasive, such as English Ivy and Periwinkle, which only add aesthetically pleasing flora to the campus.

CAMPUS WIDE EDUCATIONAL LANDSCAPE PLAN: A campus wide educational landscape plan would change all new developed areas into landscapes that only have educational value. The landscape would be limited to plant species that are in some way interwoven into the class curriculums from lecture and lab materials to spaces that provide an outdoor venue for education. This compete overhaul would create a stronger educational environment that would cultivate the students interest in the sciences. The plan of making the landscape more educational may fall short in meeting aesthetic, cultural, environmental, and economic needs.

PROPOSED ACTION: The proposed action is the action that our group deemed the most viable option for the campuses current climate. The following is a list of what the proposed action would entail:

- Providing Plant Operations with a comprehensive list of native flora in this bioregion and natives of California.
- Perform a vegetation survey to determine the amount of non-native communities on campus.
- Provide resources to aid in future decision and management of the campus by Plant Operations
- Replace some of the non-native plant species with five native tree/shrub species on campus.

Implementation Strategies

In order to increase the educational value of the Humboldt State University campus, the following strategies will be implemented:

1. **Faculty Survey** – allowing the faculty to participate in offering suggestions regarding plant species that ought to be established on the university grounds to increase educational value. Estimated time of completion April 6th 2007 by all group members.

There are multiple ways to evaluate and monitor the campus landscape of Humboldt State University. The effectiveness of the objectives that we proposed will help the director of Plant Operation's, Doug Koketch, to receive feedback from faculty members and guidance as to what plants can be readily grown on campus and at the same time having educational value.

The faculty survey allowed the professors to offer their feedback regarding the educational value of the campus grounds. Aside from additional plants that would be preferred to be seen on campus, there was an emphasis on the presence of English Ivy, which is an invasive plant widely used on campus. It was pointed out by Professor Michael Mesler that although English Ivy is an invasive and is highly adaptive to any environment, it reduces erosion on hillsides that could potentially damage campus buildings and requires. With plants that do not have a well-established root system, there would be a lot of room for potential damage to the facilities. The English Ivy is also economically useful when managing the HSU campus when having a low budget for maintenance. That is why natives were thought to be the most economically pliable palate of plant species, but would defeat the diversity of plants that would be educational to the students whether the plants are native or not. It is important that in areas around campus that are generally flat are subject to educational plants and not ivy.

2. **Vegetation Map** – performing an inventory of predominant species in an area to classify the composition of plant communities on campus regarding their educational value. Estimated time of completion by April 27th 2007 by all group members.

Sampling methods include:

- a. Ground inventory of the HSU campus focusing on potential areas to increase educational values. The ground inventory will focus mainly on the dominant herbaceous, shrub and over story species.
- b. Delineate zones on campus based on the following criteria:
 - Site location
 - High invasive species content
 - Future development
 - Land use (fields, campus entries, etc.)
- c. Compile data into a vegetation map.

CAMPUS SURVEY

A campus survey of plant vegetation was performed in order to have an idea of the composition of plant that are in a given area. The survey emphasis was given to a stretch of area that started from Founders Hall to the Forestry Building. It was found that there was a lot of invasive, native, and non-native species present. In Table 1, the areas are listed with their corresponding classification of the current composition and in Table 2 the classification of future projections. Most of the species listed in each area are the predominant plants that are present.

English Ivy and sparse Himalaya Berry dominate the ground cover below Founders Hall. The over story is dominated by Douglas fir, with some other native species such as sword and Lady fern, Rhododendron, and Horsetail. Currently this area is mixed with natives and invasive species, but in the future this area would be perfect as a Native Area.

The pleasant area above the Science A building is a visually and environmentally pleasing area for students to visit. There are wood sculptures that are surrounded by Redwood and Dawn Redwood over story and ground cover that consists of Redwood sorrel, Sword fern, Iris, Evergreen Huckleberry, Rhododendrons and Douglas Iris. This is currently classified as mixed because there is English Ivy present on the sloping front of the garden that faces the SCI A Building because of potential erosion that could affect the building nearby. The Sword fern would be a great replacement plant for the English Ivy, allowing the plant to stabilize the soil with a strong root system. This garden would then be classified as a Native under story area if the Ivy were replaced with Sword Fern or another native species.

The area that lies between the Wildlife Building and the Science B building also suffers from English Ivy as being the dominant plant species on the ground and on the sloping planters that line the building. There are native plant species present, but a lot of ferns that are non-native, for example Tree fern and various other ferns that are not invasive but are educational due to the diversity of ferns present.

English Ivy is capable of growing under various conditions and requiring no management attention and materials such as water and fertilizer and preventing soil erosion on various slopes on campus. There are a lot of areas on campus that suffer from the overgrowth of English Ivy, it is essential that it be replaced with a species that is native and requires little management after it has been established and is able to proliferate and not choke out other plant species.

- 3. **Tree Establishment** Assisting Plant Operations in identifying appropriate areas for planting five trees of choice that are consistent with the future HSU Master Plan. Doug Koketch will oversee this plan of action. Estimated time of completion by the end of the Spring 2007 semester by all group members.
- 4. **Plant List** submit a plant list to Plant Operations for review. This plant list will be available for Plant Operations as an aid to potentially be incorporated into the landscape scheme of HSU.

Evaluation and Monitoring Plan

Monitoring:

There is no monitoring that needs to occur because our project is a document prepared for Plant Operations representative Doug Koketch to use as a tool to better develop educational vegetation zones on the campus. The document is to provide insight into some of the needs of the students and faculty with regards to educational vegetation.

This project is currently being monitored by Professor Richard Hansis. Professor Richard Hansis will complete a final assessment of our project by the end of May. Doug Koketch will complete future monitoring.

Evaluation:

The success or viability of our project will be based on:

- 1.) Meeting the proposed goals under the goals and objectives section of this document.
- 2.) Submitting a complete final document to Doug Koketch
- 3.) Plant five trees in an educational vegetation zone by the end of the spring 2007 semester.

Lessons Learned

There are many lessons that were learned during the process of this project. As in any group project there are a lot of obstacles to overcome when working in a group. There are problems associated with communication, designation of work loads, enthusiasm towards the project, etc. The group dynamics were somewhat slow because all group members were interested in taking various turns on the project. The project had started out as a Management Plan for Plant Operations, which was over time realized that there were some conflicts with that approach. GIS layers were also of interest but were claimed to be too hard and difficult a process by a few group members. The group was then in a stage where there were multiple approaches to assist the landscape of the HSU campus to be more educational. A more educational landscape then had to be defined. Was the project strictly going to lean towards a sustainable campus with all native plants to minimize the costs of Plant Operations maintaining plants. We then decided, with the help of Michael Mesler, that his Plant Taxonomy class focuses more on nonnative plants. That brought the group to the attention that the HSU landscape did not have to be all native in order to be educational, but a mixed variety of plants that are native and non-native. It was also assumed that invasive plant species are not incorporated into the scheme of the project due to the obvious reasons of environmental factors. That is why an HSU Educational Aid incorporated information on the removal of invasive species which pose a threat to native plants communities. It was then settled that an HSU Educational Aid including removal techniques, a list of native plant species and an assessment of the campus grounds of specific areas would be able to lead the group towards the goal of understanding what an educational campus should look like compared to the current situation.

Time management was also a limiting factor to the project. It would've been more interesting to do a more in depth survey of campus vegetation, but that approach was somewhat out of the groups ability due to the fact that no members were fluent in plant taxonomy. Then an assessment of the percentage of plants that were invasive, non-native, endemic and native would've been helpful in the overall knowledge of what is on campus.

It was also difficult to get the project up and going due to the fact that there were so many discussions based on what to do and how to go about it. These discussions resulting in a lot of group work. All the documents were in a sense prepared by all the students as a whole. It would have been better if group

members were assigned more specific duties to implement the objectives in order to meet the goals of making the campus more educational.

There were limitations to the project, which included faculty involvement. There were only four email responses in lieu to the composition of plants on campus and their value to class material. There were also interviews with other professors such as Michael Camann and Mark Colwell, who showed some interest but were insufficient in the subject area. Which led the group to think that it may have been best to work only with Michael Mesler on the project.

Overall, the project has led the group to understand the dynamics of working together as a team and putting forth effort in order to achieve a common goal.

Post Project Improvements

The Master Plan for Humboldt State University was very helpful in various ways. It allowed the group to evaluate which areas are going to be restored to riparian habitats and wetlands. It also mapped out areas where buildings would be built in replacement of the old buildings. Most of the site locations that were surveyed for the project were not affected by future buildings.

"The objectives of the Master Plan are to provide a framework for implementing the Universities mission, goals, and programs by identifying facilities and improvements needed over the next several years, and to lay a framework for the next 30 to 40 years (EIR 2004)."

The Final Environmental Impact Revision Master Plan for HSU proposes that some buildings will be added on to existing buildings and the proposal of future buildings. In the area that was survey for this project, no buildings are scheduled to be built in the near future. But there are a couple of exceptions to the buildings being replaced, for example the forestry and NRPI Building will be adjoined, which will conflict with the removal of the Native plant area that is currently present between the two existing buildings. However, the Master Plan does take into account the Wildlife present on campus, for example Tree Swallows and Stellar's Jays, which nest in trees that are present on campus serving as habitat. This constitutes to the educational value of the landscape allowing wildlife to be present on campus for the observation of the students. Under Table 6-1 in the Appendix, the Master Plan lists a Special-status Wildlife Species that are reported from Arcata North and South Quads (EIR, 2004).

The Master Plan also intends to implement the restoration of Jolly Giant Creek and Fern Lake where wetlands occur at the margins and outlets of these two creeks. The plan has also taken into consideration "Special-status Plants," such as minute pocket moss (*Fissidens pauperculus*) and Running pine (*Lycopodium clavatum*). This list can be seen in the Appendix under Table 6-2.

Student Evaluations

Lindsey Kufta-Christie Hours: 59

Responsibilities: Plant List

Interviewing Faculty
Power Point Presentation
Campus Evaluation
Campus Photographs

Campus Photographs
Writing document
Faculty Survey

Post Project Improvements

Lessons Learned

Jasper Peach

Hours: 63

Responsibilities: Planting 5 trees/shrubs

Interviewing Faculty Campus Evaluation

Assembling document & layout

Invasive Species List Writing document Faculty Survey

Intro. To Vegetation Aid

Andrew Grewer

Hours:

Responsibilities: Planting 5 trees/shrubs

Writing document
Campus photographs

Faculty Survey

Faculty Survey:

Dear Professor,

This letter was written by a group of Environmental Science students conducting a project through the Sustainable Campus 411 course under Richard Hansis. This project is working towards implementing a campus landscape that enhances the educational experience and compliments lecture and lab material. This letter is being circulated among professors that have knowledge regarding plant species that should be incorporated into the campus landscape.

It is important that professors have the opportunity to participate in providing input in order to promote more collaboration between professors and the Plant Operations. Please take the time to answer the following questions. Your suggestions would be greatly appreciated. Your suggestions will, however, only be used for our group's analysis and in no way is Plant Operations responsible to implement the suggestions found in this analysis.

- 1. Do you feel that the current landscape sufficiently meets your course needs? If not, how so?
- 2. If you were able to select plant species to be incorporated in the HSU landscape, would you use those areas as an aid to your courses? Please list plant species that you would like to see on campus and rank them from most important to least important.
- 3. If more areas were designated towards enhancing the educational experience, does your class permit time for students to provide hands on work to aid in the landscape transformation processes in the future?
- 4. Please provide any additional comments with regards to the enhancement of the university's landscape.

Table 1. Summary of Faculty Survey

Question	Yes	No	Comments
Do you feel that the current landscape sufficiently meets your course needs?	3	1	More native oaks could increase the diversity in the current university landscape.
If you were able to select plant species to be incorporated in the HSU landscape, would you use those areas as an aid to your courses?	2	1	
Please list the plant species that you would like to see on campus and rank them from most important to least important.			Quercus kelloggii Quercus lobata Quercus garryana Quercus douglasii Quercus chrysolepis Lithocarpus densiflorus
If more areas were designated towards enhancing the educational experience, does your class permit time for students to provide hands on work to aid in these landscape transformation processes in the future?	3	1	A one- unit course in Botany is a desired course for students and could include the planting of native plants
Please provide additional comments with regards to the enhancement of the university's landscape.			California natives should be planted when ever possible. The university should have a program to get rid of invasive species like English ivy.

These are exact replicates from the Final Environmental Impact Report 2004 Master Plan, demonstrating Special-Statues flora and fauna species.

	ARCATA NORTH AN	ND SOUTH	1	
Common Name	Scientific Name	grant orker by	Status	Habitat
minute pocket moss	Fissidens pauperculus		1B	Forest soil
western lily	Lilium occidentale		E2, 1B	Coastal prairies & forests
northern clustered sedge	Carex arcta		2	Coastal wet areas
Lyngbye's sedge	Carex lyngbyei		2	Coastal wet areas
running pine	Lycopodium clavatum		2	Coastal forests
dark-eyed gilia	Gilia millefoliata		1B	Coastal dunes ²
Pt. Reyes bird's beak	Cordylanthus maritimus ssp. palustris		1B	Salt marshes ²
Humboldt Bay owl's clover	Castilleja ambigua ssp. humboldtiensis		1B	Salt marshes ²
Humboldt Bay wallflower	Erysimum menziesii ssp. eurekense		E2, 1B	Coastal dunes ²
pink sand verbena	Abronia umbellata ssp.b.	reviflora	SC, 1B	Coastal dunes ²
beach layia	Layia carnosa		E2, 1B	Coastal dunes ²
Indian pipe	Monotropa uniflora		1B	Mature coastal forests
Siskiyou checkerbloom	Sidalcea malviflora ssp. patula		1B	Coastal prairies, forest margins
coast checkerbloom	Sidalcea oregana ssp. eximia		1B	Coastal prairies, forest margins
E - Federal Endangered E2 - Federal & State Endangered SC - Federal Species of Concern		1B - CNPS List 1B, Plants rare, threatened, or endangered in CA and elsewhere 2 - CNPS List 2, Plants, rare, threatened or endangered in CA, but not elsewhere		

1	TABLE 6-2
	SPECIAL-STATUS WILDLIFE SPECIES THAT ARE REPORTED FROM
i	ARCATA NORTH AND SOUTH OUADS ¹

AR	CATA NORTH AND SOUTH Q	UADS ¹	40 01 - A
Common Name	Scientific Name	Status	Habitat
Great Blue Heron	Ardea herodius	SC (nesting)	Forest
Black-crowned Night Heron	Nycticorax nycticorax	SC (nesting)	Forest
California Brown Pelican	Pelecanus occidentalis californicus	E2	Near coastal waters ²
American Peregrine Falcon	Falco peregrinus anatum	E3, FD	Cliffs, forest
Osprey	Pandion haliaetus	SC (nesting)	Forest
Black-capped Chickadee	Parus artricapillus	SC2	Riparian areas
Bald Eagle	Haliaeetus leucocephalus	T	DESCRIPTION OF THE PROPERTY OF
Northern Spotted Owl	Strix occidentalis caurina	Т ,	Forests
Western Snowy Plover	Charardius alexandrius nivosus	T	Beaches, river bars ²
California Clapper Rail	Rallus longirostris obsoletus	E2	Bay estuaries ²
Short-tailed Albatross	Phoebastris albatrus	E	Near coastal waters ²
Marbled Murrelet	Brachyramphus marmoratus	T, E3	Mature forests
Xanthus's Murrelet	Synthliboramphus hypoleucus	C, ST	
Western Yellow-billed Cuckoo	Coccyzus americanus	C, E3 ve.	Riparian areas
lidewater goby	Eucyclogobius newberryi	E West Only	Estuaries ²
coast cutthroat trout	Oncorhynchus clarki clarki	SC TO M	Coastal streams ²
northern California steelhead	Oncorhynchus mykiss	T same	Coastal streams ²
oho salmon	Oncorhynchus kisutch	T, ST,	Coastal streams ²
chinook salmon	Onocorhychus tshawytscha	T	Coastal streams ²
Pacific fisher	Martes pennanti pacifica	C 1	Forests
ed tree vole	Arborimus pomo	SC	Forests
white-footed vole	Arborimus albipes	SC	Forests
orthern red-legged frog	Rana aurora aurora	SC	Ponds ²
orthwestern pond turtle	Emys marmorata marmorata	SC	Streams, ponds
outhern torrent salamander	Phygoatuiton	SC	Forests streams
H - Federal Designated Critical Habita	ST - State threatened		- CI VOIO GII CUIII3

Federal Endangered

Federal & State Endangered

State Endangered

State, Rare

ST-

PT-

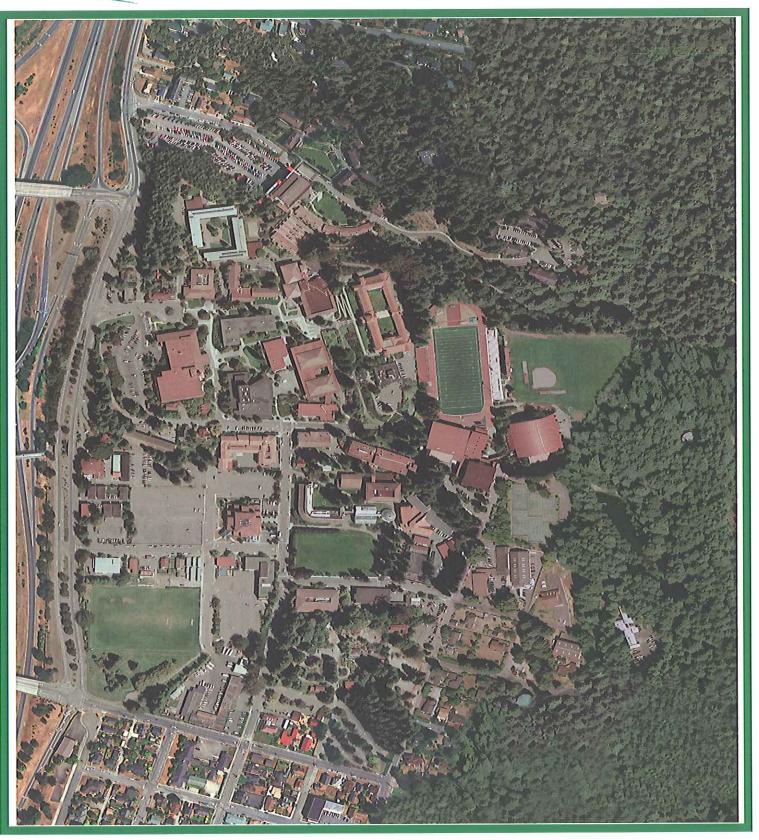
SC-

State threatened
Federal proposed threatened
Federal Species of Concern
Federal candidate to become proposed species
Federal delisted C-

FD-

f - Federal threatened

Sources: USFWS, 2004; CDFG, 2004a; CDFG, 2004b; CDFG, 2004c.
No habitat onsite: inaccessible to salmon and steelhead.



File Ref: HSU Aerial 11'04 Revised.doc Print Ref: Friday, April 06, 2007, 9:11 AM

HUMBOLDT STATE UNIVERSITY

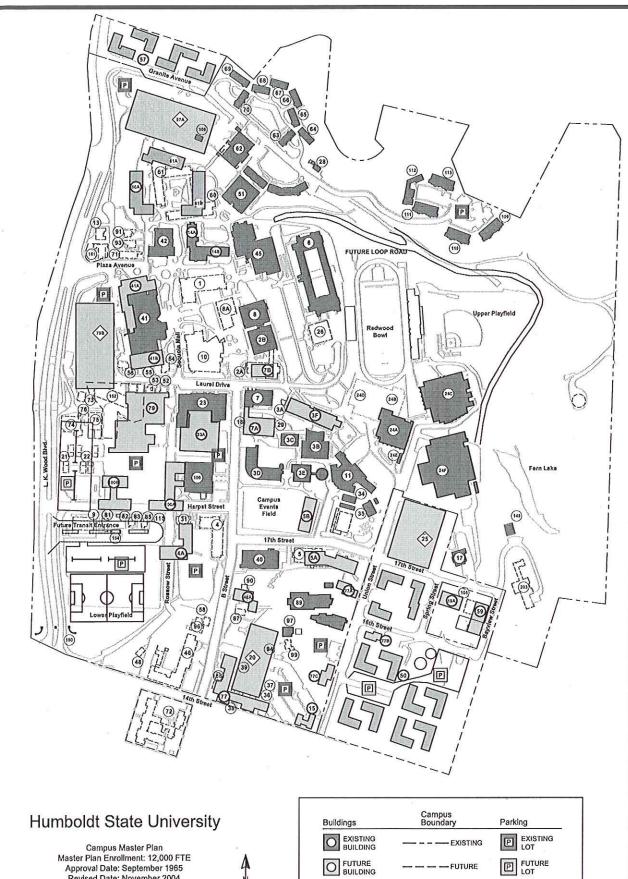
Campus Master Plan Enrollment: 12,000 FTE

Campus Master Plan approved by the Board of Trustees: May 1965

Master Plan Revision approved by the Board of Trustees: January 1967, January 1977, July 1977, November 1977, May 1978, March 1981, May 1990, November 2004

1.	Siemens Hall	53.	Warren House
2A.	Art A	54.	Telonicher House
2B.	Art B	55.	Balabanis House
3A.	Science A	56.	Hadley House
3B.	Science B	57.	Granite Student Housing
3C.	Science C	57A.	North Campus Parking Structure
3D.	Science D	58. 59.	Switchgear Building
3E.	Science E	59. 59A.	Plant Operations Storage Yard
3F.	Science Replacement Building	60.	Redwood Residence Hall
4. 4A.	Harry Griffith Hall	60A.	Sunset Residence Hall - Replacement
5.	Classroom Building Forestry	61.	Sunset Residence Hall
5A.	Laboratory Building	61A.	Redwood Residence Hall - Replacement
5B.	Science Laboratory Replacement Building	61B.	Redwood Residence Hall - Replacement
6.	Founders Hall	62.	Jolly Giant Commons
7.	Jenkins Hall	63.	Pepperwood Residence Hall
7A.	Jenkins Hall – Visual Art Renovation & Addition	64.	Tan Oak Residence Hall
7B.	Jenkins Hall – Visual Art Renovation & Addition	65.	Maple Residence Hall
8.	Music	66.	Madrone Residence Hall
8A.	Temporary Music	67.	Hemlock Residence Hall
9.	University Center Storage	68.	Chinquapin Residence Hall
10.	Theatre Arts	69.	Alder Residence Hall
11.	Wildlife & Fisheries	70.	Cedar Residence Hall
12.	Observatory (Off Campus)	71.	Little Apartments
13.	Feuerwerker House	72.	University Annex
14A.	Nelson Hall West	73.	Wagner House
14B.	Nelson Hall East	74.	Ceramics Lab
15.	Child Care	75.	Sculpture Lab
17.	Marine Wildlife Care Center	76.	Water Tower
18.	Brookins House	77.	Student Center South
20.	South Campus Parking Structure	77A.	Student Activities
21.	Redwood Manor (Administrative)	77B.	Student Activities
22.	Redwood Manor (Residential)	77C.	Student Activities
23.	Gist Hall	79.	Educational Services Building
23A.	Gist Hall – Theatre Arts Replacement & Addition	79B.	West Campus Parking Structure
24A.	Physical Education I	81.	Davis House
24B.	Natatorium	82.	Parking Authorization Center
24C.	Student Recreation Center	83. 85.	Hopkins House Spidell House
24D. 24E.	West Gym Cogeneration Unit	87.	Beard and Cables House
24E.	Physical Education II	88.	University General Storage
25.	East Campus Parking Structure	89.	Behavioral & Social Sciences
26.	Van Matre Hall	90.	Schmidt House
27.	Telonicher Marine Laboratory (Off Campus)	91.	Hagopian House
28.	Housing Operations Building	93.	Brero House
29.	Greenhouse	94.	Jensen House
31.	Swetman Child Development Lab	96.	Shipping & Receiving
33.	Natural History Museum (Off Campus)	97.	Buck House
34.	Wildlife Facilities	99.	Jenkins House
35.	Fish Hatchery	100.	Student & Business Services
36.	Mary Warren House	100A.	Classroom Building
37.	Baiocchi House	100B.	Classroom Building
38.	Walter Warren House	104.	South Campus Restrooms
39.	Toddler Annex	105.	Boat Facility
40.	Natural Resources	108.	Housing Cogeneration Building
40A.	Energy Research Lab	109.	Fern Hall
41.	Library	110.	Willow Hall
41A.	Library Addition	111.	Laurel Hall
41B.	Library Addition	112.	Creekside Lounge
42.	Student Health Center	113.	Juniper Hall
45.	University Center	115.	Temporary Buildings
46.	Plant Operations	149.	Wireless Communication Facility
48.	Hazardous Waste Handling Facility	160.	Primary Entrance Gateway
50.	Student Housing	161.	Mill Street House
51.	Cypress Residence Hall	162.	Mai Kai
52.	Bret Harte House	163.	Boating Instructional Safety Center

LEGEND: Existing Facility / Proposed Facility
Note: Building numbers correspond with building numbers in the Space and Facilities Data Base (SFDB)



Revised Date: November 2004 Main Campus Acreage: 151



0	150'	300'	600

Buildings	Campus Boundary	Parking
O EXISTING BUILDING	EXISTING	EXISTING LOT
O FUTURE BUILDING	— — — FUTURE	FUTURE LOT
TEMPORARY BUILDING		EXISTING STRUCTURE
EXISTING BUILDING NOT IN USE		FUTURE STRUCTURE

Literature Cited

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- Preston Jr., Richard J. North American Trees. Fourth Edition. United States: Iowa State University press, 1989
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