# Assessment: Program Review Update

Shasta College

## Program (AG) - Agriculture: Forest Science and Technology AS.1494

**Program Catalog Summary:** Associate
in Science:
SC Program: AS.1494

PROGRAM DESCRIPTION: The job market in forestry is strong with respect to both permanent and seasonal employment. On average, 70-80% of seasonal Natural Resources job openings in northern California are for forestry technicians. Duties will vary, but generally include timber inventory and marking, harvest plan layout, ecosystem restoration work, and wildlife surveys. Today, this new forestry must focus on the ecosystem as a whole while realizing we still need to provide a myriad of values from our forests. Such values include biodiversity, clean air and water, and recreation in addition to wood products. By properly applying ecological principles to manage our forests, we can enhance biodiversity and lessen the impact of our consumption on forests around the world.

On average, seasonal forestry technicians are paid anywhere from $10-$15 per hour. Permanent jobs for qualified technicians start around $30,000 - $40,000 per year with benefits. Students who complete the A.S. degree in Forest Science and Technology will be well prepared to transfer to a four-year degree at Humboldt State, Cal-Poly San Luis Obispo, or other out-of-state institutions such as the University of Idaho. Students should contact a member of the forestry/natural resources faculty to discuss career options and courses.

This degree is approved through the California Community College Chancellor's Office. Upon satisfactory completion of all degree requirements and filing an application for graduation with Admissions and Records, the student's transcript will reflect completion of this degree.

PROGRAM LEARNING OUTCOMES:

Upon successful completion of this certificate, the student will:

1. Have the appropriate coursework and field experience to pursue seasonal Forestry Technician jobs or to transfer to a University in a Forestry-related field.
2. Be able to properly identify all common species of trees and shrubs native to the Western US by their scientific and common names and to discuss general uses, site characteristics, and geographic distributions of these species.
3. Be able to apply knowledge of the Silvicultural treatments used to regulate stand, Composition, regenerate stands, increase growth rates, and improve timber quality.
4. Be able to apply skills in the safe use and maintenance of tools and equipment.
5. Be able to apply computer skills using Forestry-related software.
6. Be able to select and implement an appropriate protocol following the scientific method to collect, statistically analyze, evaluate, and document original research data.
7. Be able to accurately navigate in the field using maps, compass, a Global Positioning System (GPS). Students will also be able to use GPS for field data collection and Geographic Information Systems (GIS) for data mapping and display.
8. Be able to evaluate basic theory, concepts, and ecological principles as they apply to Forestry, Wildlife, Water Resources, and Ecosystem Restoration and will use his/her cumulative skills to think critically and to work out possible solutions to address problems facing Natural Resources managers today and in the future.
9. Be able to apply fundamentals of Wildland fire ecology, behavior, and suppression techniques.

DEGREE REQUIREMENTS:

CORE COURSES:

AGNR 1* Introduction to Natural Resources 3
AGNR 6 Native Plant Identification 3
AGNR 50 Natural Resources Measurements 4
AGNR 52 Computers in Ag/Natural Resources 3
AGNR 53 Forest Protection and Health 3.5
AGNR 65 Forest Ecology 3
AGNR 94 Natural Resources Worksite Learning 3
AGPS 24* Soils 3
BOT 1* General Botany 4
CHEM 2A* Introduction to Chemistry 5
FIRS 118 Introduction to Wildland Fire Fighting 2
GEOG 9 Map and Geospatial Principles 3

*May be used to fulfill General Education requirements. See a counselor.

ASSOCIATE IN SCIENCE DEGREE REQUIREMENTS:

| | |
|---|---|
| Major | 39.5 |
| Additional General Education | 18 |
| General Electives | 2.5 |
| Degree Total | 60* |

*Note: Calculation assumes a student will double-count the Multicultural graduation requirement with either a social science or humanities G.E. requirement and that the student will fulfill computer literacy through a test. If students plan well and see a counselor, they may be able to double count the Multicultural and Computer Literacy units. If these graduation requirements are added, the number of units is increased by 6 units.

## *Fall 2018*

### PRIOR PROGRAM REVIEW REFLECTION (if applicable)

**Term and Year of Previous Review:** Fall 2016
**Discuss any changes to the program as a result of the previous program review:** The Forest Science and Technology AS curriculum was updated for the 2017-2018 academic year.
**Resources Received or Requested:** Since the 2016 program review, the program received microscopes and GPS enabled tablets through Perkins funding.

### CURRENT PROGRAM REVIEW

**Who completed this form:** Melissa Markee
**Participation in completing this report:** Area Faculty (list in the next box)
**Summarize participation comments:** Program review was completed by area faculty.
**Discuss some of the program successes and benefits to the students and/or community:** After an extended period of not having students completing the Forest Science and Technology AS degree, there were two awards given for the 2017-2018 school year. In addition to the two students who graduated, there seems to be increased interest in the forestry side of the department. Historically, when polled in classes, most students in the AGNR area have been interested in the Natural Resources AS; however, in the introductory class (AGNR-1) approximately 40% of the class in fall 2018 stated their intent to complete the Forest Science and Technology AS degree.

Two forestry-specific AGNR classes that had not been offered in the previous three years have recently been included in the schedule. Silviculture and Fire Ecology (AGNR-51) was offered in Spring 2018 and Forest Protection and Health (AGNR 53) was offered in Fall 2018. A new part-time faculty member was added to teach the previously mentioned classes. This instructor is a California Registered Professional Forester and bring new expertise and credentials to our program.

Additionally, recent wildland fires have illustrated the importance of forest management to the future of California and the western United States. Following the Carr Fire, faculty received numerous phone calls from prospective students interested in studying forestry.

**List each PLO and write a brief narrative summary analysis discussing outcomes for each of them:**

1) Upon successful completion of this degree, the student should be able to have the appropriate coursework and field experience to pursue seasonal Forestry Technician jobs or to transfer to a University in a Forestry-related field.

- This PLO is addressed in all of the classes that are part of the Forest Science and Technology AS curriculum. Students completing the courses with passing grades satisfy this objective.

2) Upon successful completion of this degree, the student should be able to properly identify all common species of trees and shrubs native to the Western US by their scientific and common names and to discuss general uses, site characteristics, and geographic distributions of these species.

- This PLO is addresses through the completion of Native Plant Identification (AGNR 6) and reinforced in other courses, including Natural Resource Measurements (AGNR 50), Silviculture and Fire Ecology (AGNR 51), Forest Protection and Health (AGNR 53) and Forest Ecology (AGNR 65)

3) Upon successful completion of this degree, the student should be able to apply skills in the safe use and maintenance of tools and equipment.

- This PLO is addresses through the completion Natural Resource Measurements (AGNR 50), Silviculture and Fire Ecology (AGNR 51), and Introduction to Forest Operations (AGNR 55).

4) Upon successful completion of this degree, the student should be able to apply computer skills using Forestry-related software.

- This PLO is addresses through the completion of the Shasta College computer literacy requirement (students often use Computers for Ag and Natural Resources (AGNR 52) to complete this requirement). Other classes taken throughout the program incorporate computer skills and forestry-related software.

5) Upon successful completion of this degree, the student should be able to apply knowledge of the Silvicultural treatments used to regulate stand, Composition, regenerate stands, increase growth rates, and improve timber quality.

- This PLO is addresses through the completion of Silviculture and Fire Ecology (AGNR 51), Forest Protection and Health (AGNR 53), and Introduction to Forest Operations (AGNR 55).

6) Upon successful completion of this degree, the student should be able to select and implement an appropriate protocol following the scientific method to collect, statistically analyze, evaluate, and document original research data.

- This PLO is addressed in all courses that are part of the Forest Science and Technology AS degree.

7) Upon successful completion of this degree, the student should be able to accurately navigate in the field using maps, compass, a Global Positioning System (GPS). Students will also be able to use GPS for field data collection and Geographic Information Systems (GIS) for data mapping and display.

- This PLO is addresses through the completion of Maps and Geospatial Principals (GEOG 9) and Introduction to Geographic Information Systems (GEOG 10).

8) Upon successful completion of this degree, the student should be able to evaluate basic theory, concepts, and ecological principles as they apply to Forestry, Wildlife, Water Resources, and Ecosystem Restoration and will use his/her cumulative skills to think critically and to work out possible solutions to address problems facing Natural Resources managers today and in the future.

- This PLO is addressed in all courses that are part of the Forest Science and Technology AS degree.

9) Upon successful completion of this degree, the student should be able to apply fundamentals of Wildland fire ecology, behavior, and suppression techniques.

- This PLO is addresses through the completion of Silviculture and Fire Ecology (AGNR 51).

**Describe how this program supports a transfer pathway to CSU or UC:** The Forest Science and Technology AS degree is closely aligned to the curriculum for the forestry program at Humboldt State University. There are only three 4-year forestry programs in the CSU and UC system. Most Shasta College students looking to complete a 4-year degree and remain in-state are interested in Humboldt State University. The Forest Science and Technology AS degree also transfers well to Cal Poly, San Luis Obispo but does not transfer well to UC Berkley.

**Specify Labor Market Demand (for CTE programs):** According to the U.S. Bureau of Labor Statistics Employment Projections program, jobs for forestry and conservation technicians and foresters are expected to increase by 3.8 and 5%, respectively, between 2016 and 2026. This data coupled with an aging work force in the discipline suggest a good demand for employees. Student with the Forest Science and Technology AS degree would be well prepared to work as a technician. Additionally, with additional experience and/or educations, students may qualify to work as a forester.

## PROGRAM DATA ANALYSIS

**Program Effectiveness:** While the number of Forest Science and Technology AS degrees awarded by Shasta College remains low, 2 students recently completed the program 2017-2018. It is anticipated that additional students will be awarded a degree for the 2018-2019 academic year.

Students have been successful in gaining both seasonal and permanent employment. Following the summer of 2018, three students were retained by employers and may opt to not complete their degrees. Students are currently working with both private and public companies. Transfer students who have gone on to complete BS degrees have also been successful in gaining permanent employment. In addition to the job board is maintained in the 1200 building, positions are posted electronically through the Forestry and Natural Resources Club Canvas page and the AgNR & Heavy Equipment Resource Center to assist students in finding openings.

**Program Effectiveness (CTE):** In March 2018, the Forestry and Natural Resources program received special recognition from the Chancellor's Office for its strong workforce outcomes. The program receives a Bronze Star award for demonstrating a 86% increase in earnings for students who were last enrolled in 2015-2016.

**Course Success Rates:** The average success rates for courses within the forestry and natural resources program are 72.40, 74.72, 73.41% during the past 3 academic years.

**Course Retention Rates:** The average retention rates for courses within the forestry and natural resources program are 83.44, 85.75, 83.99% during the past 3 academic years.

**Course Enrollments:** The average census date enrollments for courses within the forestry and natural resources program are 22.6, 21.3, and 21.3 during the past 3 academic years.

**Equity:** The average percentage of male and female enrollments for courses within the forestry and natural resources program has been 56.79% and 42.62% respectively for the past three academic years. The average percentage of ethnicity for categories presented in area planning data for the past 3 years is as follows: 3.10% American Indian, 2.05% Asian, 0.85% black or African American, 0.08% Hawaiian/Pacific Islander, 13.53% Hispanic, 69.75% white, 0.86% non-resident alien, 5.83% two or more races, and 3.94% unknown. The average percentage for age categories presented in area planning data for the past 3 years is as follows: 29.56% 19 or less, 31.64% 20 to 24, 13.23% 25 to 29, 8.56% 30 to 34, 6.37% 35 to 39, 5.38% 40 to 49, and 5.56% 50 and older.

## CURRICULUM

**Review of courses with prerequisites:** Coursed offered in the Ag-Natural Resources area and required to the Forest Science and Technology AS degree to not have prerequisites. Botany (BOT 1) and General Chemistry (CHEM 1A) have prerequisites that are set by SLAM division faculty.

**Challenges to offering key courses:** No courses are recommended to be removed from the program at this time. Courses struggle to meet the minimum enrollment of 20 students per unit often requested by administration. It would be helpful if courses only offered once per year or once every other year were exempt from the same enrollment requirements of general education classes that are offered multiple times each semester. Introduction to Forest Operations has not been recently offered, but is planned for the Spring 2020 schedule.

**Course changes:** No changes have been made to the titles of any of the program related courses. The addition of new courses to the degree or certificate are not recommended at this time.

## SUMMARY

**Changes or improvements needed based on the analysis above:** No changes or improvements to the program are needed at this time. This may be reevaluated if the program does not continue to have awards given on an annual basis.

**Note any resources you intend to request through the Area Planning process to improve the program:** A computer cart is being requested for to improve the program. With the removal of the 1200 building computer lab in fall 2017, students have less access to computer resources that are important for students to apply computer skills using Forestry-related software.

**Other information/reflections on the program:** None

**Conclusion:** The Forest Science and Technology AS program is a unique program to Shasta College and the California Community College system. Given our local resources and the importance of forest management, the program is valuable to our community and environment. The program appears to be in a growth period and additional awards are anticipated in the coming academic years.

****BELOW TO BE COMPLETED BY THE PROGRAM REVIEW COMMITTEE****

## COURSE STATISTICS

| | | Academic Year | | | | |
|---|---|---|---|---|---|---|
| Course Name | | 2012-13 | 2013-14 | 2014-15 | 2015-16 | 2016-17 |
| AGNR-1 | # of Sections | 2 | 2 | 2 | 1 | 1 |
| | Enrollment | 49 | 47 | 44 | 23 | 20 |
| | FTES | 7.7 | 7.5 | 6.5 | 3.2 | 3.0 |
| | FTEF | 0.57 | 0.57 | 0.28 | 0.28 | 0.28 |
| | WSCH | 230 | 225 | 193 | 95 | 90 |
| | Avg Enrl/Section | 25 | 24 | 22 | 23 | 20 |
| | Avg FTES FTEF | 13.54 | 13.24 | 14.12 | 11.19 | 10.59 |
| | Avg WSCH FTEF | 406 | 397 | 424 | 335 | 318 |
| AGNR-6 | # of Sections | 1 | 1 | 1 | 1 | 1 |
| | Enrollment | 25 | 27 | 22 | 25 | 26 |
| | FTES | 4.0 | 3.8 | 3.5 | 3.7 | 3.8 |
| | FTEF | 0.28 | 0.28 | 0.28 | 0.28 | 0.28 |
| | WSCH | 120 | 115 | 105 | 110 | 115 |
| | Avg Enrl/Section | 25 | 27 | 22 | 25 | 26 |
| | Avg FTES FTEF | 14.12 | 13.52 | 12.35 | 12.95 | 13.52 |
| | Avg WSCH FTEF | 424 | 406 | 371 | 388 | 406 |
| AGNR-50 | # of Sections | 1 | 1 | 1 | 1 | 1 |
| | Enrollment | 25 | 19 | 19 | 20 | 13 |
| | FTES | 6.4 | 4.5 | 5.1 | 4.3 | 3.5 |
| | FTEF | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 |
| | WSCH | 192 | 136 | 152 | 128 | 104 |
| | Avg Enrl/Section | 25 | 19 | 19 | 20 | 13 |
| | Avg FTES FTEF | 14.77 | 10.45 | 11.70 | 9.85 | 8.01 |
| | Avg WSCH FTEF | 443 | 314 | 351 | 295 | 240 |
| AGNR-52 | # of Sections | 2 | 2 | 2 | 2 | 3 |
| | Enrollment | 44 | 38 | 38 | 51 | 53 |
| | FTES | 7.5 | 5.5 | 5.2 | 7.5 | 8.8 |
| | FTEF | 0.57 | 0.57 | 0.57 | 0.57 | 0.85 |
| | WSCH | 225 | 165 | 155 | 225 | 265 |
| | Avg Enrl/Section | 22 | 19 | 19 | 26 | 18 |
| | Avg FTES FTEF | 13.24 | 9.71 | 9.11 | 13.24 | 10.40 |
| | Avg WSCH FTEF | 397 | 291 | 274 | 397 | 312 |
| AGNR-65 | # of Sections | 1 | 1 | 1 | | 1 |
| | Enrollment | 24 | 17 | 19 | | 26 |
| | FTES | 4.1 | 2.9 | 3.3 | | 4.3 |
| | FTEF | 0.28 | 0.28 | 0.28 | | 0.28 |
| | WSCH | 123 | 87 | 98 | | 129 |
| | Avg Enrl/Section | 24 | 17 | 19 | | 26 |
| | Avg FTES FTEF | 14.12 | 9.99 | 11.19 | | 14.72 |
| | Avg WSCH FTEF | 434 | 307 | 346 | | 455 |
| AGNR-94 | # of Sections | 12 | 8 | 3 | 4 | 9 |
| | Enrollment | 16 | 12 | 3 | 16 | 16 |
| | FTES | 1.0 | 0.7 | 0.2 | 1.0 | 1.2 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | FTEF | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| | WSCH | 132 | 91 | 30 | 129 | 158 |
| | Avg Enrl/Section | 1 | 2 | 1 | 4 | 2 |
| | Avg FTES FTEF | | | | | |
| | Avg WSCH FTEF | | | | | |
| AGPS-24 | # of Sections | 2 | 3 | 3 | 3 | 3 |
| | Enrollment | 61 | 65 | 69 | 70 | 76 |
| | FTES | 9.1 | 8.9 | 8.5 | 9.4 | 10.8 |
| | FTEF | 0.57 | 0.69 | 0.80 | 0.85 | 0.85 |
| | WSCH | 262 | 255 | 235 | 257 | 308 |
| | Avg Enrl/Section | 31 | 22 | 23 | 23 | 25 |
| | Avg FTES FTEF | 15.99 | 13.71 | 10.56 | 11.11 | 12.71 |
| | Avg WSCH FTEF | 462 | 393 | 294 | 302 | 362 |
| BOT-1 | # of Sections | 1 | 2 | 2 | 2 | 2 |
| | Enrollment | 37 | 63 | 63 | 58 | 64 |
| | FTES | 9.1 | 15.7 | 14.9 | 14.4 | 14.4 |
| | FTEF | 0.43 | 0.87 | 0.87 | 0.87 | 0.87 |
| | WSCH | 272 | 472 | 448 | 432 | 432 |
| | Avg Enrl/Section | 37 | 32 | 32 | 29 | 32 |
| | Avg FTES FTEF | 20.93 | 18.15 | 17.23 | 16.62 | 16.62 |
| | Avg WSCH FTEF | 628 | 545 | 517 | 498 | 498 |
| CHEM-2A | # of Sections | 21 | 21 | 22 | 21 | 23 |
| | Enrollment | 617 | 639 | 594 | 573 | 562 |
| | FTES | 138.8 | 131.0 | 131.6 | 125.1 | 124.9 |
| | FTEF | 6.36 | 5.62 | 5.70 | 5.49 | 6.05 |
| | WSCH | 4,163 | 3,929 | 3,949 | 3,754 | 3,746 |
| | Avg Enrl/Section | 29 | 30 | 27 | 27 | 24 |
| | Avg FTES FTEF | 25.55 | 28.04 | 28.54 | 27.99 | 25.12 |
| | Avg WSCH FTEF | 769 | 844 | 858 | 842 | 756 |
| FIRS-118 | # of Sections | 1 | 1 | 3 | 1 | 1 |
| | Enrollment | 17 | 15 | 22 | 18 | 19 |
| | FTES | 1.3 | 1.3 | 2.3 | 0.3 | 1.0 |
| | FTEF | 0.14 | 0.14 | 0.08 | 0.00 | 0.14 |
| | WSCH | 38 | 39 | 63 | 8 | 28 |
| | Avg Enrl/Section | 17 | 15 | 7 | 18 | 19 |
| | Avg FTES FTEF | 8.68 | 8.96 | 5.89 | | 6.85 |
| | Avg WSCH FTEF | 268 | 275 | 171 | | 198 |
| GEOG-9 | # of Sections | | 2 | 1 | 1 | 2 |
| | Enrollment | | 49 | 24 | 31 | 39 |
| | FTES | | 6.8 | 4.0 | 2.9 | 4.2 |
| | FTEF | | 0.57 | 0.28 | 0.28 | 0.57 |
| | WSCH | | 205 | 120 | 144 | 157 |
| | Avg Enrl/Section | | 25 | 24 | 31 | 20 |
| | Avg FTES FTEF | | 12.05 | 14.12 | 10.24 | 7.36 |
| | Avg WSCH FTEF | | 362 | 424 | 508 | 277 |
| Grand Total | # of Sections | 44 | 44 | 41 | 37 | 47 |
| | Enrollment | 833 | 873 | 830 | 793 | 796 |

| | | | | | |
|---|---|---|---|---|---|
| FTES | 188.9 | 188.6 | 185.0 | 171.8 | 179.9 |
| FTEF | 9.63 | 10.02 | 9.58 | 9.05 | 10.61 |
| WSCH | 5,757 | 5,719 | 5,548 | 5,282 | 5,532 |
| Avg Enrl/Section | 19 | 20 | 20 | 21 | 17 |
| Avg FTES FTEF | 21.71 | 21.64 | 22.33 | 22.66 | 19.70 |
| Avg WSCH FTEF | 652 | 650 | 669 | 685 | 594 |