

R. Academic Program Undergraduate Report

MISSION: Our educational mission for the undergraduate (and graduate) programs is to provide learning experiences and opportunities that will ensure students learn to function effectively in their chosen fields.

Central to the instruction goals of the department and the basis of Outcomes Assessment (Appendix O.) are students' abilities to:

- Identify, explain and critically evaluate their own beliefs, values and actions in relation to professional and societal standards of ethics.
- Anticipate, analyze and evaluate natural resource issues and opportunities, explaining the ecological, economic, and social consequences of natural resource actions at various scales and over time.
- Actively seek the input and perspectives of diverse stakeholders regarding natural resource problems and issues.
- Assess, analyze, synthesize, and evaluate information fairly and objectively.
- Work effectively, both individually and with others, on complex, value-laden natural resource problems that require holistic problem solving approaches.
- Formulate and evaluate alternative solutions to complex problems and recommend and defend best alternatives.
- Communicate clearly and effectively with all audiences using appropriate oral, visual, electronic, and written techniques.
- Recognize and interpret resource problems and opportunities across spatial scales from local to global.
- Appreciate cultural diversity and understand the impact of the global distribution of people and wealth on natural resource use and valuation.
- Exercise leadership skills as professionals and engaged citizens.
- Demonstrate creativity and innovation in identifying and pursuing opportunities that produce environmental, social, or economic value.
- Exercise life-long learning skills developed before graduation.

R.1 Description of Undergraduate Majors and Curricula

a. Student demographic information:

Enrollment in both the Animal Ecology and Forestry majors has increased over the seven year period, 2008 through 2015 (Table 4.2). Due to the large number of students transferring into our program after attending two-year colleges and transferring within Iowa State, juniors and seniors constitute the largest class sizes (R.1).

Ratio of female to male students has been

Table R.1 Yearly enrollment by student rank, 2010-2014					
Rank	Year (based on Fall enrollment)				
	2010	2011	2012	2013	2014
Freshman	67	73	76	76	82
Sophomore	92	76	84	93	91
Junior	114	130	110	138	111
Senior	115	143	167	155	169
Total	388	422	437	462	453

increasing each year for the five year period, 2010 through 2015 (Table R.2)

Fourteen percent of NREM students were classified as “minority” status in 2014. This represents a 5% increase in minority students since 2010 (Table R.3).

Table R.2 Gender reported by year, 2010-2014					
Enrollment by Gender	Year (based on Fall semester enrollment)				
	2010	2011	2012	2013	2014
Female	174	207	222	250	252
Male	214	215	215	212	201
Total	388	422	437	462	453

Table R.3 Ethnicity reported by year, 2010-2014.					
Enrollment by Race	Year (based on Fall semester enrollment)				
	2010	2011	2012	2013	2014
Native American or Alaska Native	0	0	0	1	1
Asian	4	3	1	4	2
Black or African American	4	4	4	8	5
Hispanic	15	18	21	27	26
International	1	1	1	0	0
Multiple	3	4	6	8	12
Native Hawaiian or Pacific Islander	0	0	0	0	1
Not reported	9	10	9	12	18
White	352	382	395	402	388
Total	388	422	437	462	453

- b. **Animal Ecology major:** Animal Ecology majors must complete 128 credits, with a minimum grade point average of 2.0, to complete their program and graduate with a Bachelor of Science degree. No more than 65 credits from a two-year institution may be applied to meet graduation requirements for the Animal Ecology major.

Animal Ecology Core Degree Requirements:

- 16 credits in Interpersonal and Public Communication Skills courses (e.g., English and Speech Communication courses),
- 9-10 credits in Mathematical Sciences (Mathematics and Statistics),
- 13 and 14 credits in Physical Sciences (Chemistry and Physics).
- 21 credits in Biological Sciences, including General Ecology, Vertebrate Biology, Principles of Biology I and II,
- 3 courses, including Orientation in Natural Resource Ecology and Management, Introduction to Renewable Resources, and Careers in Natural Resources.
- 3 credit course from university-approved lists in the following areas: Ethics, Humanities, Social Sciences, U.S. Diversity, and International Perspectives.
- 400 hours of career-related experience prior to graduation (NREM 104; Practical Experience). These experiences may include volunteer or paid employment in teaching- and research-related activities (i.e., in a laboratory or as a teaching assistant), or serving as an intern or employee with a natural resource agency, or business that requires expertise in natural resources.

Each Animal Ecology major is required to specialize in one of four “options” typically selected by the end of the sophomore year:

- **Fisheries and Aquatic Sciences:** Requirements include a course in Fish Biology, Aquatic Ecology, Calculus, and at least 20 credits of electives from an approved list of Fisheries and Aquatic Sciences courses.
- **Interpretation of Natural Resources:** Requirements include a course in Natural History of Iowa Vertebrates, Plant Systematics, Insect Biology, Principles of Interpretation, Plant Ecology, Dendrology, and one course in soil science, climatology, astronomy, or geology from an approved list. Students must also complete 12 credits of coursework from an approved list of restricted electives and an internship (1-3 credits).
- **Pre-veterinary and Wildlife Care:** Required courses in Domestic Animal Physiology, Anatomy and Physiology of Domestic Animals, and Behavioral Ecology, Domestic Animal Behavior and Well-Being, Animal Behavior, or Primate Evolutionary Ecology and Behavior; one course in Fish Biology, Natural History of Iowa Vertebrates, Herpetology, Ornithology, or Mammalogy, one course in animal anatomy, histology, or endocrinology, and one course in animal reproduction, genetics, or developmental biology. A course in animal medicine, aquaculture, wildlife disease, nutrition, parasitology, or microbiology is also required; the remaining requirements of 15 credits from an approved list of courses.
- **Wildlife:** Requirements include courses in Ecological Methods, Wildlife Ecology and Management, genetics, Plant Systematics, and calculus. Students must also complete two courses in Herpetology, Ornithology, or Mammalogy, two courses focused on wildlife or natural resource policy, one course from an approved list of animal biology and ecology courses, and at least five credits in botany courses.

c. [Forestry major:](#) The primary goal of the Forestry curriculum is to educate foresters to be capable of scientifically managing the nation’s forest lands – private and public. The program offers courses that are concerned with the management of forest ecosystems for multiple benefits including wood and fiber products, biodiversity, recreation, interpretation, water, wilderness, and wildlife. Conservation and preservation of natural resources are emphasized.

Forestry majors must complete 128 credits, with a minimum grade point average of 2.0, to complete their program and graduate with a Bachelor of Science degree. No more than 65 credits from a two-year institution may be applied to meet graduation requirements for the Forestry major. As of the Fall 2014 semester, 96 undergraduate students were enrolled as Forestry majors. This number represents an increase of 19 students since Fall 2010.

Forestry Core Degree Requirements:

- 12.5 course credits in Interpersonal and Public Communication Skills (e.g., specific English and Speech Communications courses),
- 22 course credits in Mathematics, Physical and Life Sciences (Fundamentals of Soil Science, Principles of Biology I, College Chemistry, two courses in Mathematics and one course in Statistics),
- 12 specific courses (30 credits) in Forestry and Natural Resource Ecology and Management.

- Students are also required to complete 15 course credit hours from the approved list of courses in Ethics, Humanities, Sociology, U.S. Diversity, and International Perspectives.
- 400 hours of career-related experience prior to graduation (NREM 104; Practical Experience). These experiences may include volunteer or paid employment in teaching- and research-related activities (i.e., in a laboratory or as a teaching assistant), or serving as an intern or employee with a natural resource agency, or business that requires expertise in natural resources.

Fall semester of the sophomore year is dedicated to immersion in the forestry curriculum. Integrated courses during this semester include 201, 202, 203, 204, and 205, and culminate in a three week forestry camp (206) experience. Forestry camps have been held continuously since 1914 with the exception of a three year interruption due to World War II. Forestry camp is held at various locations throughout the U.S. and allows students to get firsthand experience in professional forestry techniques.

Each Forestry major is required to specialize in one of five options/ specializations:

- **Forest Ecosystem Management:** In addition to core requirements of the Forestry major, requirements for the option in Forest Ecosystem Management include an additional 35 course credits in Principles of Biology II, specific Forestry and NREM courses, and Mathematics.
- **Interpretation of Natural Resources:** Students in this option must complete 34 course credits in Animal Ecology, Biology, Entomology, Forestry, Natural Resource Ecology and Management, Agronomy, Astronomy, and Geology.
- **Natural Resource Conservation and Restoration:** Students within this option must complete 44 credits from a list of courses in Animal Ecology, Biology, Forestry, Natural Resource Ecology and Management, Mathematics, and Plant Pathology.
- **Sustainable Materials Science and Technology:** Students in this option must complete 29 course credits from a specific list of course in the following areas: Forestry, Mathematics, and Technology and Systems Management.
- **Urban and Community Forestry:** Students in this option must complete 34 credits from specific courses in the following areas: Biology, Community and Regional Planning, Forestry, Natural Resource Ecology and Management, Mathematics, Plant Pathology, and Sociology.

d. Additional opportunities for NREM students: In addition to the Practical Experience requirement, many Animal Ecology and Forestry majors obtain additional applied experience by enrolling in (NREM 104, Science with Practice), internship experience, or working closely with NREM faculty and graduate students through paid or volunteer positions in the lab or classroom. Department faculty advise several natural resource oriented [student clubs](#), new student mini camp, [Department seminars](#) and many opportunities for [study abroad](#).

R.d.1 NREM Learning Communities are available to first semester [freshman](#) and to [transfer](#) students. Learning Communities allow block scheduling ensuring that you can enroll in the classes needed for your major and clustering your living quarters allowing you to group study and have group field trips and other activities. For example, some activities by our students have included field trips to regional points of natural resource interest, Blank Park and Omaha Zoo, etc.

R.d.2. On-Line Instruction

NREM/AGRON 120 XW, Introduction to Renewable Resources. This course has been offered since at least 2013, each semester. It is taught in conjunction with a live-audience class of about 200 students, also taught each semester. Recorded lectures from the live sessions are used for the online section. The instructors are Dr. Rick Hall and Dr. James Pritchard. Each semester the online section enrolls between 40 and 100 students, who are mostly ISU students living in Ames.

NREM/AGRON 120 will be offered for the first time during a summer semester (Summer 2015), to be instructed by Dr. Lidia Skrynnikova.

NREM 270 XW, Foundations in Natural Resource Policy & History. This course first went online in Fall 2014, enrolling 43 students. It is co-instructed by Dr. Lidia Skrynnikova and Dr. James Pritchard. Dr. Skrynnikova takes the lead on the technological aspects of the instructional program, and facilitates student participation in online discussions. Dr. Pritchard records lectures, organizes academic portions of assignments and provides other essential functions. This partnership is a good example of utilizing cooperative departmental expertise to put forward an online course. The course concepts and materials were originally created by Dr. Pritchard, but without the web-savvy expertise of Dr. Skrynnikova, this class simply wouldn't make it past the first click of a mouse. Dr. Skrynnikova has developed an online presence and expertise by offering Environmental Issues in Russia (RUS 375, 35 students in F14) and Environmental Thinkers in Russia (RUS 370, 61 students in S15). Dr. Skrynnikova reports that enrollment fills quickly, with only a bit of on campus advertising.

Future Directions in Offering Online Courses

1. The appointment of three (3) additional faculty lines would facilitate the expansion of online instruction in multiple courses, in some combination of current and new faculty & instructors.
2. The main challenge in online instruction is the large time input requirements, substantially more than anticipated in the early days of online course development.
3. Team teaching looks promising for the development of online courses. An instructor who is web-savvy can be a great help (a critical resource) for creating a high quality and functional course, based on a faculty member's existing course.
4. The courses mentioned above should continue to be offered online, and faculty might be incentivized to bring additional courses into the mix.

R.2 Student Credit Hour generation

The total number of student credit hours taught by NREM instructors, has increased since 2012. Numbers of students enrolled in the largest lecture classes has increased since 2010, as indicated by the steady increase in the maximum student credit hours taught by a single instructor.

Table R.4. Student credit hours (SCH) taught by NREM instructors (2012-2015). [Maximum SCH = most SCH by any instructor; Minimum SCH = fewest SCH by any instructor.]										
	Fall					Spring				
	2010	2011	2012	2013	2014	2011	2012	2013	2014	2015
Total SCH	3,653	4,190	5,120	4,845	5,346	3,446	3,727	3,737	4,077	
Mean SCH/instructor	183	210	197	211	223	203	177	197	185	

Maximum SCH	518	498	604	764	732	668	588	734	860	
Minimum SCH	42	33	2	51	30	30	4	2	5	
Number of instructors	20	20	26	23	24	17	20	19	22	

R.3 Potential Career Paths for NREM Students (by major and option)

R.3.a Animal Ecology Major

- Students in the Fisheries and Aquatic Sciences option are trained for careers as Aquatic Scientists, Fisheries Technicians, Fish and Wildlife Specialists, Wetland Scientists, Environmental Consultants, Aquaculturists, or Fisheries Biologists.
- Students in the Interpretation of Natural Resources option are equipped to pursue careers as Environmental Educators, Naturalists, Interpreters, Extension Educators, Park Rangers, Conservation Officers, and Recreation Specialists.
- Students completing the Pre-veterinary and Wildlife Care option generally pursue careers in Veterinary Medicine or Wildlife Rehabilitation, or are employed as a Zookeeper, Animal Care Specialist, or Game Farm Manager.
- Students completing requirements for the Wildlife option are qualified for careers in Animal Ecology, Ornithology or Avian Ecology, Habitat Management, Wildlife Biology, or Ecology, or obtain employment as a Natural Resource Technician, Wilderness Ranger, GIS Specialist, or Game Warden.

R.3.b Forestry Major

- Students within the Forest Ecosystem Management option are trained for careers as a District Forester, Industrial Forester, Forest Ecologist, or Forestry Consultant.
- Students in the Interpretation of Natural Resources option are trained for employment as Outdoor Environmental Educator, Naturalist, Park Ranger, and Recreation Specialist.
- Students in the Natural Resource Conservation and Restoration option are prepared for careers as District Conservationists, Land Managers, and Restoration Ecologists.
- Students in the Sustainable Materials Science and Technology option qualify for careers in Wood Product Sales and Development, and are also employed as Log Procurement Specialists and Mill Plant Managers.
- Students completing requirements for the Urban and Community Forestry option are employed as Arborists, Municipal Foresters, Plant Health Care Specialists, and Nursery Managers.

R.4. NREM Student employment

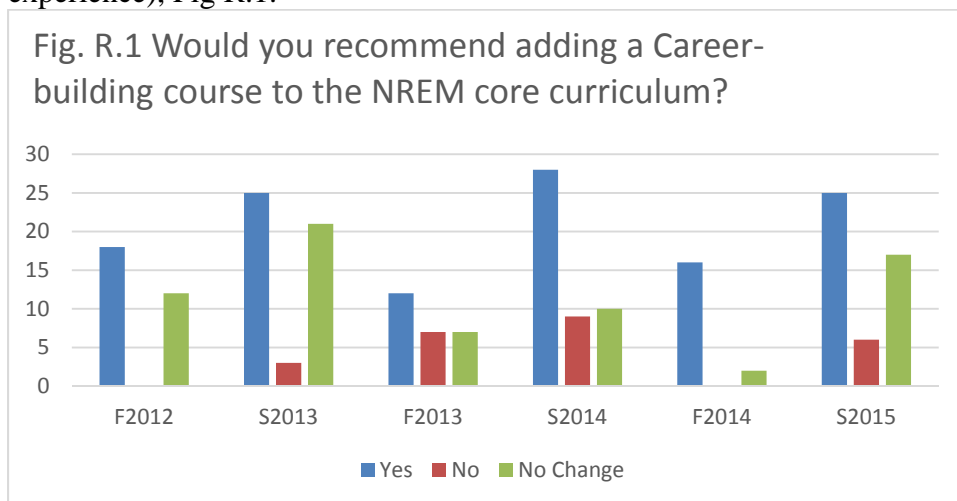
NREM students in both majors have found employment in a diversity of career opportunities. CALS offers a Career Fair each spring and fall that students are encouraged to attend. Many students have met success through internship and work opportunities. In addition, Mr. Burnett maintains an [employment list on the NREM website](#) and sends announcements to seniors as they anticipate graduation. Results of a CALS survey indicate average salary for both the Animal Ecology and Forestry majors (Table R.5). Placement and destination statistics are collected by the College and summarized by major (Table R.6).

Job title	Avg. salary	No. students
Companion Animal Industry	\$13,000	1
Conservation Officer/Park Ranger	25,140	5
Environmental Consultant	48,375	4
Environmental Technician	31,526	7
Firefighter	27,189	5

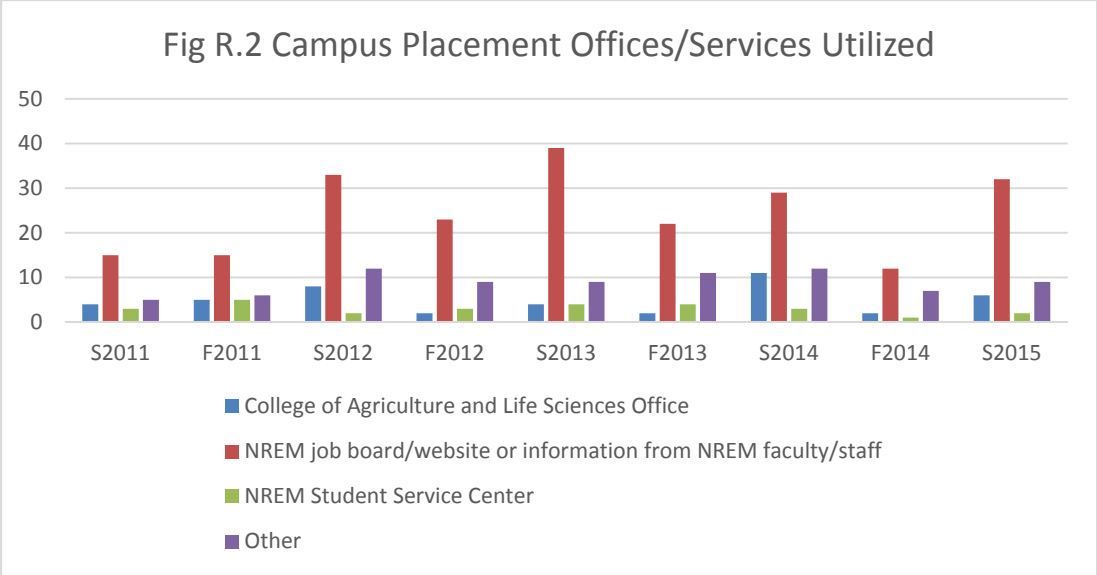
Fisheries Biologist/Technician	24,560	9
Forest Ranger	30,660	2
Government	38,384	4
Government/Private Forestry Tech	30,773	26
Service Work	24,468	15
Urban Forester	30,583	6
Wildlife Biologist/Technician	26,143	26
Wood Products	30,440	4
Graduate School		115
Major Total	\$30,051	215
CALS – B.S. Animal Ecology (FY2014)	16,176	4
CALS – B.S. Forestry (FY2014)	35,500	4

R.5 Results of Senior Exit Interview: Prior to spring and fall graduations, graduating students are asked to respond to a written questionnaire. An exit interview is also held either individually or with a small group (2-4 students) with the Department Chair.

- Students felt that class content, and contact with ISU professors were the most important contributors to their future success, ranking 4.19 and 4.16 (scale 0-5; 5= greatest impact), respectively.
- When asked what changes they would recommend to improve the NREM curriculum, students indicated that including career-building courses in the NREM core curriculum was most highly supported (compared with seminar-style course and required research experience), Fig R.1.



- Students felt that the NREM job board/website was the most important campus placement resource utilized (Fig R.2).



- Students rated their advisors in the good to excellent range for all attributes (Fig. R.3)

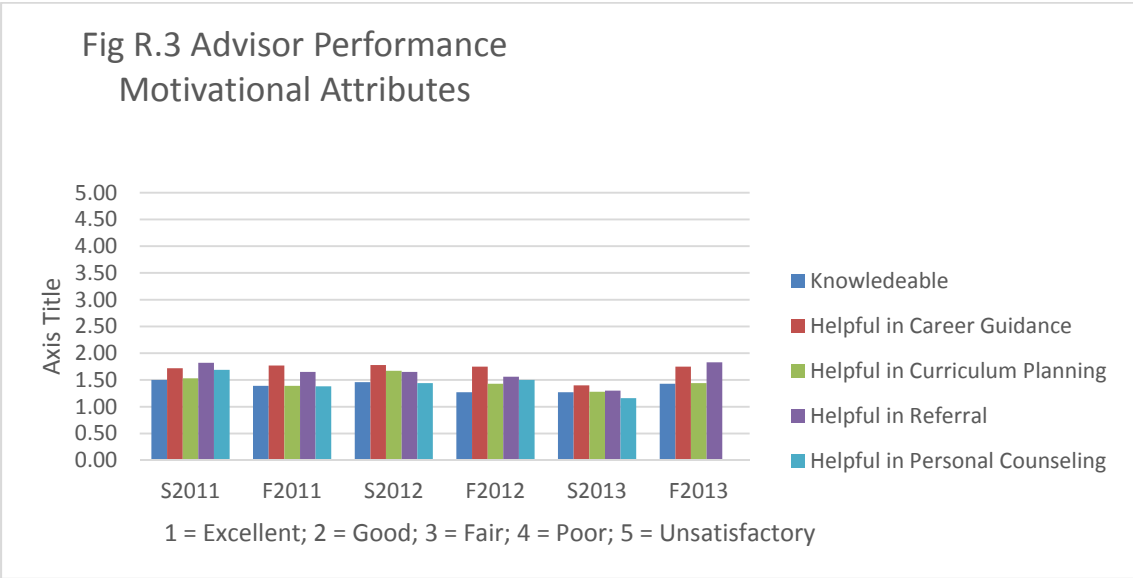


Table R.6. First Destination/Placement of Animal Ecology and Forestry Undergraduate and Graduate Students, 2013-2014.

	# Grads	# of Survey Respondents	Total Employed ²	Employed In Iowa ⁷	Employed Out of Iowa ⁷	Professional Employment ⁸	Further	% Placed ⁴	Seeking ⁵	Not Seeking	No Info ⁶
Ag Business	113	113	109	80	29	107 / 98.2%	3	99.1%	1		
Ag & Life Sci. Educ.	38	38	34	28	6	33 / 97.0%	3	97.4%	1		
Ag Studies	103	101	99	86	13	93 / 93.9%	2	100.0%			2
Agronomy	74	72	58	45	13	57 / 98.3%	13	98.6%	1		2
Animal Ecology	82	77	67	46	21	54 / 80.6%	9	98.7%	1		5
Animal Science	170	168	103	72	31	96 / 93.2%	64	99.4%	1		2
Biology	71	67	32	21	11	30 / 93.7%	3	95.5%	1	2	4
Env. Science	17	17	10	8	2	9 / 90.0%	6	94.1%		1	
Forestry	21	20	18	14	4	16 / 88.9%	2	100.0%			1
Genetics	10	10	3	2	1	3 / 100%	5	80.0%	1	1	
Global Resource Sys.	14	13	6	1	5	6 / 100%	7	100.0%			1
Horticulture	35	34	28	13	15	26 / 92.9%	5	97.1%	1		1
Insect Science	5	5	2	1	1	1 / 50.0%	3	100.0%			
TOTAL Sum 13 - Spr 14	906	884 of 906 97.6%	690 of 884 78.1%	495 of 690 71.7%	195 of 690 28.3%	644 / 690 93.3%	180 of 884 20.4%	870 of 884 98.4%	10 of 884 1.1%	4 of 884 0.4%	22 of 906 2.4%
TOTAL Sum 13 - Spr 14	906	884 of 906 97.6%	690 of 884 78.1%	495 of 690 71.7%	195 of 690 28.3%	644 / 690 93.3%	180 of 884 20.4%	870 of 884 98.4%	10 of 884 1.1%	4 of 884 0.4%	22 of 906 2.4%
TOTAL Fall 12 - Sum 13	773	743 of 773 96.1%	580 of 743 78.1%	403 of 580 69.5%	177 of 580 30.5%	551 / 580 95.0%	143 of 743 19.2%	723 of 743 97.3%	14 of 743 1.9%	6 of 743 0.8%	30 of 773 3.9%
TOTAL 11-12	756	736 of 756 97.4%	601 of 736 81.7%	439 of 601 73.0%	162 of 601 27.0%	565 / 601 94.0%	119 of 736 16.2%	720 of 736 97.8%	14 of 736 1.9%	2 of 736 0.2%	20 of 756 2.6%
TOTAL 10-11	679	669 of 679 98.5%	535 of 669 80.0%	389 of 535 72.7%	146 of 535 27.3%	511 / 535 95.5%	118 of 669 17.6%	653 of 669 97.6%	14 of 669 2.1%	2 of 669 0.3%	10 of 679 1.5%
TOTAL 09-10	668	658 of 668 98.5%	491 of 658 74.6%	372 of 491 75.8%	119 of 491 24.2%	467 / 491 95.1%	155 of 658 23.6%	646 of 658 98.2%	10 of 658 1.5%	2 of 658 0.3%	10 of 668 1.5%