

**Tree-Ring Lab  
Faculty Meeting Agenda  
February 9, 2011**

1. Building Update
2. Groundbreaking
3. Review SWES/SEES Environmental Science Program
4. Administrative Staff workload
5. Budget & Teaching
6. Scholarships – Shulman & Bristlecone pine
7. Haury Fellowship Program

College of Science  
FY2009 Budget, ICR, SCH and Majors

		A	B	C	D	E	A+D+E	F	G	H	I	J	K	G+I+K	C+G+I+K/A	G+I+K/A
Department	Fall State FTE	Perm State Budget including Temp Funding	ICR Return to University	ICR Return to College	ICR Return to Department	Summer Session Dist	Total Department Budget	Total SCH	SCH * \$187	Total Majors	Majors * \$620	Total Degrees	Degrees * \$1500	Total Instruction	College ICR\$+SCH\$+MAJOR\$+DEGREE\$/Perm State Budget incl Temp	Total Instruction/Perm State Budget incl Temp
Astronomy	101.63	7,769,559	8,398,146	1,567,306	1,023,230	15,987	8,808,776	9,773	1,827,551	216	133,920	15	22,500	1,983,971	0.46	25.54%
Atmospheric Sciences	16.35	1,127,485	725,998	158,197	115,484	6,877	1,249,846	5,965	1,115,455	49	30,380	5	7,500	1,153,335	1.16	102.29%
Biosphere 2	-	-	16,785	4,112	3,002	-	3,002	232	43,384	-	-	-	-	43,384	0.00	0.00%
Chemistry/Biochemistry	138.90	9,253,525	4,281,929	1,026,343	709,093	195,200	10,157,818	38,520	7,203,240	1,493	925,660	103	154,500	8,283,400	1.01	89.52%
Cognitive Science	8.83	514,646	92,726	16,638	9,456	-	524,102	741	138,567	-	-	-	-	138,567	0.30	26.92%
Computer Science	32.85	2,595,474	895,553	393,610	379,932	31,018	3,006,424	7,737	1,446,819	406	251,720	91	136,500	1,835,039	0.86	70.70%
Dean's Office	21.26	1,295,041	5,209	10,162	10,162		1,305,203	734	137,258	810	502,200	11	16,500	655,958	0.51	50.65%
Ecology/Evolutionary Biology	47.91	3,653,074	1,121,778	267,041	194,940	14,351	3,862,366	10,992	2,055,504	1,361	843,820	108	162,000	3,061,324	0.91	83.80%
Geosciences	48.11	3,437,598	1,016,676	215,791	157,527	24,653	3,619,779	11,066	2,069,342	329	203,980	44	66,000	2,339,322	0.74	68.05%
Hydrology/Water Resources	19.51	1,820,866	1,423,919	348,879	211,295	-	2,032,161	1,572	293,964	122	75,640	24	36,000	405,604	0.41	22.28%
Mathematics	102.30	8,363,138	1,210,064	252,966	179,479	285,979	8,828,596	46,677	8,728,599	830	514,600	63	94,500	9,337,699	1.15	111.65%
Molecular/Cellular Biology	44.79	2,428,073	1,791,817	325,835	234,875	24,110	2,687,058	7,689	1,437,843	1,032	639,840	170	255,000	2,332,683	1.09	96.07%
Neuroscience	-	1,420,594	723,676	183,674	83,674	788	1,505,056	366	68,442	-	-	-	-	68,442	0.18	4.82%
Physics	65.88	4,422,416	1,004,836	247,772	177,374	63,397	4,663,187	13,868	2,593,316	418	259,160	40	60,000	2,912,476	0.71	65.86%
Planetary Sciences	35.85	3,008,502	5,068,955	1,262,478	921,609	315	3,930,426	5,857	1,095,259	58	35,960	8	12,000	1,143,219	0.80	38.00%
Psychology	59.74	3,723,672	1,082,196	254,796	203,176	141,709	4,068,557	32,006	5,985,122	3,802	2,357,240	455	682,500	9,024,862	2.49	242.36%
Speech/Hearing Sciences	20.64	1,601,843	495,789	121,563	88,995	18,867	1,709,705	6,002	1,122,374	626	388,120	94	141,000	1,651,494	1.11	103.10%
Tree-Ring Laboratory	12.77	1,069,340	255,200	63,070	45,369	4,949	1,119,658	2,355	440,385	-	-	-	-	440,385	0.47	41.18%
<b>College of Science Total</b>	<b>777.32</b>	<b>57,504,846</b>	<b>29,611,252</b>	<b>6,720,233</b>	<b>4,748,673</b>	<b>828,201</b>	<b>63,081,720</b>	<b>202,152</b>	<b>37,802,424</b>	<b>11,552</b>	<b>7,162,240</b>	<b>1,231</b>	<b>1,846,500</b>	<b>46,811,164</b>	<b>0.93</b>	<b>81.40%</b>
<b>University</b>	<b>5,728.06</b>	<b>589,553,400</b>	<b>79,104,766</b>	<b>19,846,778</b>	<b>59,257,988</b>	<b>-</b>	<b>648,811,388</b>	<b>921,717</b>	<b>172,361,079</b>	<b>70,887</b>	<b>43,949,940</b>	<b>7,896</b>	<b>11,844,000</b>	<b>228,155,019</b>	<b>0.42</b>	<b>38.70%</b>

Table listed below is Same as above, but removing majors and degrees income, so more comparable with Tree-Ring Laboratory (and added summer session return which was omitted in original table):

A	B	C	D	E	A+D+E	F	G	H	I	J	K	G+I+K	C+G+I+K/A	G+I+K/A
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Department	Fall State FTE	Perm State Budget including Temp Funding	ICR Return to University	ICR Return to College	ICR Return to Department	Summer Session Dist	Total Department Budget	Total SCH	SCH * \$187	Total Majors	Majors * \$620	Total Degrees	Degrees * \$1500	Total Instruction	College ICR\$+SCH\$+MAJOR\$+DEGREE\$/Perm State Budget incl Temp	Total Instruction/Perm State Budget incl Temp
Astronomy	101.63	7,769,559	8,398,146	1,567,306	1,023,230	15,987	8,808,776	9,773	1,827,551	216	1	15	1	1,827,553	0.44	23.52%
Atmospheric Sciences	16.35	1,127,485	725,998	158,197	115,484	6,877	1,249,846	5,965	1,115,455	49	1	5	1	1,115,457	1.13	98.93%
Biosphere 2	-	-	16,785	4,112	3,002	-	3,002	232	43,384	-	1	-	1	43,386	0.00	0.00%
Chemistry/Biochemistry	138.90	9,253,525	4,281,929	1,026,343	709,093	195,200	10,157,818	38,520	7,203,240	1,493	1	103	1	7,203,242	0.89	77.84%
Cognitive Science	8.83	514,646	92,726	16,638	9,456	-	524,102	741	138,567	-	1	-	1	138,569	0.30	26.93%
Computer Science	32.85	2,595,474	895,553	393,610	379,932	31,018	3,006,424	7,737	1,446,819	406	1	91	1	1,446,821	0.71	55.74%
Dean's Office	21.26	1,295,041	5,209	10,162	10,162	-	1,305,203	734	137,258	810	1	11	1	137,260	0.11	10.60%
Ecology/Evolutionary Biology	47.91	3,653,074	1,121,778	267,041	194,940	14,351	3,862,366	10,992	2,055,504	1,361	1	108	1	2,055,506	0.64	56.27%
Geosciences	48.11	3,437,598	1,016,676	215,791	157,527	24,653	3,619,779	11,066	2,069,342	329	1	44	1	2,069,344	0.66	60.20%
Hydrology/Water Resources	19.51	1,820,866	1,423,919	348,879	211,295	-	2,032,161	1,572	293,964	122	1	24	1	293,966	0.35	16.14%
Mathematics	102.30	8,363,138	1,210,064	252,966	179,479	285,979	8,828,596	46,677	8,728,599	830	1	63	1	8,728,601	1.07	104.37%
Molecular/Cellular Biology	44.79	2,428,073	1,791,817	325,835	234,875	24,110	2,687,058	7,689	1,437,843	1,032	1	170	1	1,437,845	0.73	59.22%
Neuroscience	-	1,420,594	723,676	183,674	83,674	788	1,505,056	366	68,442	-	1	-	1	68,444	0.18	4.82%
Physics	65.88	4,422,416	1,004,836	247,772	177,374	63,397	4,663,187	13,868	2,593,316	418	1	40	1	2,593,318	0.64	58.64%
Planetary Sciences	35.85	3,008,502	5,068,955	1,262,478	921,609	315	3,930,426	5,857	1,095,259	58	1	8	1	1,095,261	0.78	36.41%
Psychology	59.74	3,723,672	1,082,196	254,796	203,176	141,709	4,068,557	32,006	5,985,122	3,802	1	455	1	5,985,124	1.68	160.73%
Speech/Hearing Sciences	20.64	1,601,843	495,789	121,563	88,995	18,867	1,709,705	6,002	1,122,374	626	1	94	1	1,122,376	0.78	70.07%
Tree-Ring Laboratory	12.77	1,069,340	255,200	63,070	45,369	4,949	1,119,658	2,355	440,385	-	1	-	1	440,387	0.47	41.18%
<b>College of Science Total</b>	<b>777.32</b>	<b>57,504,846</b>	<b>29,611,252</b>	<b>6,720,233</b>	<b>4,748,673</b>	<b>828,201</b>	<b>63,081,720</b>	<b>202,152</b>	<b>37,802,424</b>	<b>11,552</b>	<b>18</b>	<b>1,231</b>	<b>1,846,500</b>	<b>39,648,942</b>	<b>0.81</b>	<b>68.95%</b>
<b>University</b>	<b>5,728.06</b>	<b>589,553,400</b>	<b>79,104,766</b>	<b>19,846,778</b>	<b>59,257,988</b>	<b>-</b>	<b>648,811,388</b>	<b>921,717</b>	<b>172,361,079</b>	<b>70,887</b>	<b>43,949,940</b>	<b>7,896</b>	<b>11,844,000</b>	<b>228,155,019</b>	<b>0.42</b>	<b>38.70%</b>

# SEES DEPARTMENTS INFORMATION

January 21, 2011

<i>Dept. Personnel Headcount</i>	NEW	GEOSCIENCES	ATMO	HYDRO & WATER	TREE RING LAB	
STATE FUNDED Faculty		29	9	15	7	60
STATE FUNDED Lecturers/Instructors		3	2	0	3	8
*SOFT FUNDED Lecturers			0	2	0	68
Research Scientists (NON STATE FUNDED)		22	8	13	5	48
STATE FUNDED Support Staff		10	4	4	6	24
*SOFT FUNDED Support Staff		17	0	3	0	72
Grad Students (supported)		82	32	4	10	128
						408

\*SOFT FUNDED: ICR or other departmental funds

## State Funded Faculty Locations

Gould Simpson  
 Haury Building  
 PAS  
 Marshall  
 Harshbarger  
 West Stadium  
 Off-Campus  
 TBD

GEOSCIENCES	ATMO	HYDRO & WATER	TREE RING LAB	TOTAL FACULTY IN BUILDING
26				26
1				1
1	14			15
1		2		3
		13		13
			7	7
			1	1
			1	1

TOTAL BUILDINGS/LOCATIONS 8

	GEOSCIENCES #1205	ATMO #0402 & 0501	HYDRO & WATER #1203	TREE RING LAB #1204	
<i>Business Office Personnel &amp; Location</i>	Gould Simpson	PAS	Harshbarger	West Stadium	
Staff FTE	4.00	1.53	1.90	1.50	8.93 Total Staff FTE
Students FTE	1.00	0.50	0.25	0.50	2.25 Total Student FTE

<b>Business Staff Breakdown</b>		<b>GEOSCIENCES #1205</b>	<b>ATMO #0402 &amp; 0501</b>	<b>HYDRO &amp; WATER #1203</b>	<b>TREE RING LAB #1204</b>	
Sylvia Quintero	<u>Staff</u>	1.00				
Sharon Bouck	<u>Staff</u>	1.00				
Denise Carrillo	<u>Staff</u>	1.00				
Heather Alvarez	<u>Staff</u>	1.00				
Erna Dubravik	<u>Student</u>	0.50				
Briana Moreno	<u>Student</u>	0.50				
Sandra Holford	<u>Staff</u>		1.00			
Sonya Basurto	<u>Staff</u>		0.33	primarily Dept. Head Assistant		
C. Jones	<u>Staff</u>		0.10	IT person who does purchasing for Bus. Ofc.		
M. Leuthold	<u>Staff</u>		0.10	IT person who does purchasing for Bus. Ofc.		
Ivonne Angulo	<u>Student</u>		0.25			
Myoff Smoth	<u>Student</u>		0.25			
Thomas Alavarez	<u>Staff</u>			0.90		
Margaret Dewitt	<u>Staff</u>			1.00		
Morgan Smith	<u>Student</u>			0.25		
Ana Martinez	<u>Staff</u>				1.00	
Regan Holliday	<u>Staff</u>				0.50	
Student Assistant	<u>Student</u>				0.50	

<b>FRS Accounts:</b>		<b>Beginning with</b>				
	<b>1</b>	7	6	3	3	
	<b>2</b>	51	17	13	12	
	<b>3</b>	53	20	37	24	
	<b>4</b>	15	10	9	6	<b>174 Grants</b>
	<b>5</b>	39	9	8	9	
	<b>7</b>	14		1	0	
<b>Foundation</b>	Endow. etc	12	1	4	7	
	Restricted			4		
	Scholarship	11		2		
		<b>202</b>	<b>63</b>	<b>81</b>	<b>61</b>	<b>407 Total Accounts</b>

<b>RATIOS</b>	<b>GEOSCIENCES #1205</b>	<b>ATMO #0501</b>	<b>HYDRO &amp; WATER #1203</b>	<b>TREE RING LAB #1204</b>	
	<b>Number of STAFF</b>	<b>4</b>	<b>1.53</b>	<b>1.9</b>	<b>2</b>
Number of State Funded Faculty	29	9	15	7	
<b>One Staff member for every</b>	<b>7.25 Fac</b>	<b>5.9 Fac</b>	<b>7.9 Fac</b>	<b>3.5 Fac</b>	
Number of Accounts	202	63	81	61	
<b>One Staff member for</b>	<b>51 Accts</b>	<b>41 Accts</b>	<b>43 Accts</b>	<b>31 Accts</b>	
Unit's State Budget	4,415,564	1,375,478	2,344,732	1,258,721	
Unit's Grant Budget	5,141,777	2,268,644	4,790,022	963,513	
Unit's Total Budget	9,557,341	3,644,122	7,134,754	2,222,234	
<b>One Staff member for every</b>	<b>\$2.4M</b>	<b>\$2.4M</b>	<b>\$3.8M</b>	<b>\$1.1M</b>	

**How difficult would it be  
to Centralize this task?**

(1 easy, 10 very difficult)

TASK	G*	Would take FTE?		
			for FACULTY	for STAFF
Payroll		1.5	1	7
PR PI Calculations	G	0.25	9	4
Human Resources		0.5	2	2
HR Issues		0.1	9	6
Check Requests	G	0.25	8	5
Travel	G	0.5	10	10
IDB's		0.1	1	2
Pcard	G	0.75	4	10
Buyways	G	0.25	1	5
Purchase Reqs.	G	0.25	1	1
P. O.-Sub-Awards	G	0.05	10	10
Deposits		0.2	1	1
Proposals	G	1.5	10	5
Grant Accounting	G	3	10	5
Property Management		0.25	1	5
State Budgets		0.25	1	10
Motor Pool Docs	G	0.05	1	10
Scholarships/Awards	G	0.1	1	2
Contracts		0.25	10	10
Lab Accounting		0.3	10	10
A/R (Invoices)		0.1	10	10
Tracking/Maintaining Wire Transfers		0.1	5	5
Effort Reporting	G	0.05	1	1
Staff Performance Reviews		0.1	1	10
Building Monitor		0.05	1	10

10.8

There are many tasks not listed that are supplied by the Business Offices.

## SEES DEPARTMENTS INFORMATION

21-Jan-11

Dept. Pers NEW	GEOSCIENCES	ATMO	HYDRO &	TREE RING LAB
STATE FUNDED Faculty	29	9	15	7
STATE FUNDED Lecturers/Instruc	3	2	0	3
*SOFT FUNDED Lecturers		0	2	0
Research Scientists (NON STATE F	22	8	13	5
STATE FUNDED Support Staff	10	4	4	6
*SOFT FUNDED Support Staff	17	0	3	0
Grad Students (supported)	82	32	4	10

	SEES numbers	LTRR numbers	
STATE FUNDED Tenure-Track Faculty	7	6.37	Malcolm Hughes <sup>1</sup> (0.88); Katie Hirschboeck (1.0); Steve Leavitt (1.0); Paul Sheppard (1.0); Tom Swetnam (1.0); Valerie Trouet (1.0); Russ Monson (0.49) <sup>2</sup>
ENDOWMENT FUNDED Tenure-Track Faculty		0.51	Dendroarcheology faculty line <sup>3</sup>
SOFT FUNDED Tenure-Track Faculty		0.1	Connie Woodhouse <sup>4</sup> (0.10)
STATE FUNDED Principal Investigators, Non-Tenure Track Faculty	3	3.07	Pearce Paul Creasman <sup>5</sup> (1.0); David Meko <sup>6</sup> (0.75); Ramzi Touchan <sup>6</sup> (0.81); Ron Towner <sup>6</sup> (0.51);
SOFT FUNDED Principal Investigators, Non Tenure Track Faculty & PostDocs	5	4.19	Dave Meko (0.25); Ellis Margolis (1.0) <sup>7</sup> ; Irina Panyushkina <sup>7</sup> (0.5); Matt Salzer <sup>7</sup> (1.0); Ramzi Touchan (0.20); Kiyomi Morino <sup>7</sup> (1.0); Ron Towner (0.24)
STATE FUNDED Teaching Assistants		1.5	
SOFT FUNDED Lecturers	0	0.25	Ron Towner (0.25)
STATE FUNDED Support Staff	6	5.23	Rex Adams (1.0); Chris Biasan (0.80); Martin Munro (1.0); Ana Martinez (1.0); Regan Holliday (0.5); Lori Wilson (0.5); Dick Warren (0.43)
SOFT FUNDED Support Staff	0	2.78	Chris Baisan (0.20); Jim Parks (1.0); Mark Losleben (1.0); Dick Warren (0.58)
SOFT FUNDED Graduate Student Research Assistantships	10	10	
<b>total</b>	<b>31</b>	<b>34</b>	

**Other Faculty & Scientists, currently housed in west stadium & will be housed in new Tree-Ring Building:**

Don Falk (Assoc. Prof. in SNRE & Joint in LTRR; all of his fte is in SNRE; 30% of his ICR on tree-ring related projects come to LTRR  
 Jeff Dean, Professor Emeritus (he is still an active grantsman, and all his ICR comes to LTRR)  
 Bryant Bannister, Emeritus Professor & Director (no active grants)  
 Ann Lynch, U.S. Forest Service scientist (office support funds come through LTRR; future space agreement in new LTRR building)  
 Henry Diaz, retired NOAA scientist

**Footnotes:**

- Hughes receives part of his salary funding from CALS, where he has a joint appointment in SNRE
- Russ Monson has his primary academic appointment in SNRE (51%) and his secondary joint appointment in LTRR (49%). This is an agreement with the deans that his ICR in the first years go to IE, and then after that the split will be SNRE & LTRR (51-49); teaching SCH should be split this way from the start
- This is Agnese & Emil Hauri endowed chair in Dendroarcheology; it will be 51% LTRR, 49% ANTH; currently being searched at assistant professor level; ICR and teaching SCH will be split according to FT
- Woodhouse has her line in Geography, but LTRR has been paying equivalent of about 1 month summer salary, or about 0.1 fte; 30% of her ICR on tree-ring related projects come to LTRR, she gets laboratory and office space in West Stadium and new building
- Creasman is Curator Collections, and is on continuing eligible status; he also is a principal investigator and grantsman, and we may engage him in some limited teaching duties, time permitting
- Meko, Touchan, and Towner are all partial state funded, non-tenure track faculty (all currently have title of Assoc. research Professor); they all are primarily research grantsmen, with some other lab support duties as well they also teach courses (Meko and Touchan on state funding and Towner on soft funding for his teaching)
- Margolis, Morino, Panyushkina, Salzer are postdoctoral scientists and/or Adjunct Assist. Research Profs. (non-tenure track); all serve as PIs or Co-Pis on grants; some limited teaching with soft funding compensatio

Fiscal YR	Person	% Resp	%Effort	Proposal	Proposal Title 1	Start	End	Req Amt	Status	Award Action Date	Awd Amt	PI Awd Amt TRL	PI AWD Amt all	PT AWD Amt Oth Dept	Account	Sponsor	IDC Rate
09/10	BAISAN, CHRISTOPHER H	20	8	1002332A	DENDROCHRONOLOGY BASED	6/11/2010	6/30/2010	36,590	Awarded	6/11/2010	36,590	7,318	7,318		325430 USFS	0	
09/10	BAISAN, CHRISTOPHER H	20	8	1002332B	DENDROCHRONOLOGY BASED	6/11/2010	6/30/2011	112,170	Awarded	8/20/2010	112,170	22,434	22,434		325430 USFS	0	
09/10	BAISAN, CHRISTOPHER H	30	16	1000262A	FINGERPRINTING CAUSES OF IN	8/15/2009	11/30/2010	31,469	Awarded	9/12/2009	24,363	7,309	7,309		320100 NPS	17.5	
09/10	CREASMAN, PEARCE PAUL	100	18	1100055A	CONDUCT PILOT PROJECT TO C	9/1/2010	3/31/2013	57,000	Awarded	9/9/2010	57,000	57,000	57,000		333910 NPS	17.5	
04/05	DEAN, JEFFREY S	100	0	0401406C	SOUTHWESTERN ARCHAEOLOG	8/1/2004	7/31/2007	0	Awarded	5/9/2006	80,264	0	80,264	0	339650 NSF	0	
04/05	DEAN, JEFFREY S	100	13	0401406A	SOUTHWESTERN ARCHAEOLOG	8/1/2004	7/31/2005	234,486	Awarded	6/29/2004	77,378	77,378	77,378	0	339650 NSF	50.5	
04/05	DEAN, JEFFREY S	100	0	0401406B	SOUTHWESTERN ARCHAEOLOG	8/1/2004	7/31/2006	234,486	Awarded	5/19/2005	76,844	76,844	76,844	0	339650 NSF	50.5	
05/06	DEAN, JEFFREY S	33	8	02000221	INTEGRATED GRADUATE TRAIN	2/1/2006	9/30/2008	316,320	Awarded	9/1/2006	316,320		104,386	104,386	330500 NSF	8	
07/08	DEAN, JEFFREY S	65	8.5	0701019A	SOUTHWESTERN ARCHAEOLOG	8/1/2007	7/31/2008	239,534	Awarded	8/1/2007	239,534	155,697	155,697	0	303830 NSF	51	
10/11	DEAN, JEFFREY S	50	0.08	1000957A	SOUTHWEST ARCHAEOLOGICAL	9/1/2010	8/31/2011	79,981	Awarded	9/1/2010	79,981	39,991	39,991	0	333720 NSF	51.5	
05/06	EVANS, MICHAEL N	50	0	0600146B	DEVELOPING AND USING REALI	6/1/2006	5/31/2008	0	Awarded	3/19/2007	96,264		43,132	0	356070 NOAA	0	
05/06	EVANS, MICHAEL N	50	8	0600146A	DEVELOPING AND USING REALI	6/1/2006	5/31/2008	185,575	Awarded	8/28/2006	89,311		44,656	0	356070 NOAA	50.5	
07/08	EVANS, MICHAEL N	40	4.5	0702102A	EL NINO: A NEW ATMOSPHERIC	9/17/2007	8/24/2008	100,000	Awarded	10/24/2007	100,000		40,000	40,000	402560 JPL	51	
07/08	EVANS, MICHAEL N	100	8	0701694A	CMG COLLABORATIVE RESEARC	10/1/2007	9/30/2010	169,201	Awarded	8/31/2007	169,201	169,201	169,201	0	304990 NSF	51	
06/07	FALK, DONALD A	90	35	0602019A	HYDE PARK/LITTLE TESUQUE W	8/7/2006	9/30/2009	321,132	Awarded	8/7/2006	321,132	289,019	289,019	0	357230 USFS	10	
06/07	FALK, DONALD A	90	42	0601431A	FIRE REGIMES ON MONTANE G	10/1/2006	9/30/2009	224,989	Awarded	2/1/2007	224,989	202,490	202,490	0	420530 VCT	20	
07/08	FALK, DONALD A	100	0	0800462A	GROWTH AND DEMOGRAPHY C	8/28/2007	9/1/2009	42,963	Awarded	9/13/2007	42,963	0	42,963	42,963	304930 USFS	0	
07/08	FALK, DONALD A	100	1	0800462B	GROWTH AND DEMOGRAPHY C	8/28/2007	9/1/2009	55,254	Awarded	9/26/2007	55,254	0	55,254	55,254	304930 USFS	0	
07/08	FALK, DONALD A	100	3	0800462C	GROWTH AND DEMOGRAPHY C	9/4/2007	6/1/2011	40,011	Awarded	9/25/2008	40,011	0	40,011	40,011	304930 USFS	0	
07/08	FALK, DONALD A	70	2	0800462D	GROWTH AND DEMOGRAPHY C	9/4/2007	6/1/2011	46,596	Awarded	9/14/2009	46,956	0	32,869	32,869	304930 USFS	0	
07/08	FALK, DONALD A	70	2	0800462E	GROWTH AND DEMOGRAPHY C	9/4/2007	9/4/2007	35,000	Awarded	8/13/2010	35,000	0	24,500	24,500	304930 USFS	0	
07/08	FALK, DONALD A	85	4	0802231A	FIRE-SCAPE	5/5/2008	9/30/2008	35,000	Awarded	5/6/2008	35,000	0	29,750	29,750	307520 USFS	10	
07/08	FALK, DONALD A	85	4	0802231B	FIRE-SCAPE	5/5/2008	9/30/2008	100,000	Awarded	7/31/2008	100,000	0	85,000	85,000	307520 USFS	10	
08/09	FALK, DONALD A	90	1	0900354C	RESEARCH AND TOOLS TO ASSE	8/27/2008	8/1/2012	20,000	Awarded	9/14/2009	20,000	0	18,000	18,000	310780 USFS	0	
08/09	FALK, DONALD A	50	1	0900586A	ESTIMATION OF FIRE INTERVAL	9/18/2008	9/1/2009	54,000	Awarded	9/23/2008	54,000	0	27,000	27,000	312200 USFS	0	
08/09	FALK, DONALD A	100	1	0900586B	ESTIMATION OF FIRE INTERVAL	9/18/2008	9/18/2013	56,638	Awarded	9/14/2009	53,000	0	53,000	53,000	312200 USFS	0	
08/09	FALK, DONALD A	100	1	0900586C	ESTIMATION OF FIRE INTERVAL	9/18/2008	9/18/2013	55,570	Awarded	8/20/2010	55,570	0	55,570	55,570	312200 USFS	0	
08/09	FALK, DONALD A	100	1	0900610A	RESTORING FIRE AT MONUMENT	8/29/2008	12/31/2008	8,994	Awarded	1/6/2009	8,994	0	8,994	8,994	406790 NMHU	26	
09/10	FALK, DONALD A	50	10	0901218A	FIRE AND CLIMATE CHANGE IN	8/17/2009	12/31/2010	285,624	Awarded	9/3/2009	285,625	142,813	142,813		317750 USFS	0	
09/10	FALK, DONALD A	50	10	0901218B	FIRE AND CLIMATE CHANGE IN	8/17/2009	4/30/2011	20,700	Awarded	8/20/2010	20,700	10,350	10,350		317750 USFS	0	
09/10	FALK, DONALD A	100	3	0903096A	CENTRAL OREGON FIRE HISTOR	9/1/2009	12/31/2011	6,773	Awarded	8/9/2009	6,773	0	6,773	6,773	317170 USFS	0	
09/10	FALK, DONALD A	100	7.7	0903096B	CENTRAL OREGON FIRE HISTOR	9/1/2009	12/31/2013	16,000	Awarded	8/23/2010	16,001	0	16,001	16,001	317170 USFS	0	
09/10	FALK, DONALD A	100	3	1000082A	THE PINALENO FOREST DEMOC	7/23/2009	5/31/2014	38,500	Awarded	7/28/2009	38,500	0	38,500	38,500	316050 USFS	10	
09/10	FALK, DONALD A	50	3	1000392A	CORONADO NATIONAL FOREST	8/31/2009	1/31/2014	270,000	Awarded	9/4/2009	270,000	0	135,000	135,000	318520 USFS	10	
09/10	FALK, DONALD A	25	1	1000392B	CORONADO NATIONAL FOREST	8/31/2009	1/31/2014	290,000	Awarded	9/4/2009	290,000	0	72,500	145,000	318520 USFS	10	
09/10	FALK, DONALD A	50	2	1000392B	CORONADO NATIONAL FOREST	8/31/2009	1/31/2014	290,000	Awarded	9/4/2009	290,000	0	145,000	145,000	318520 USFS	10	
09/10	FALK, DONALD A	100	1	1001443A	FIRE HISTORY RESEARCH IN CE	1/1/2010	12/31/2010	21,459	Awarded	12/31/2009	21,459	0	21,459	21,459	484440 RMTRTR	10	
10/11	FALK, DONALD A	50	4	1100106A	AN ASSESSMENT OF CURRENT I	7/15/2010	9/30/2012	49,921	Awarded	9/9/2010	24,961	12,481	12,481		334130 NPS	17.5	
05/06	HIRSCHBOECK, KATHERINE K	100	1	0502014A	FRACTIONAL SNOW COVER EST	9/1/2005	8/31/2008	24,000	Awarded	10/3/2005	24,000	24,000	24,000	0	351610 NASA GOD	0	
05/06	HIRSCHBOECK, KATHERINE K	100	1	0502014B	FRACTIONAL SNOW COVER EST	9/1/2005	8/31/2008	24,000	Awarded	7/14/2006	24,000	24,000	24,000	0	351610 NASA GOD	0	
05/06	HIRSCHBOECK, KATHERINE K	100	1	0502014C	FRACTIONAL SNOW COVER EST	9/1/2005	8/31/2008	24,000	Awarded	9/7/2007	24,000	24,000	24,000	0	351610 NASA GOD	0	
05/06	HIRSCHBOECK, KATHERINE K	100	0.13	0600363A	THE CURRENT DROUGHT IN CO	8/1/2005	9/30/2007	227,184	Awarded	12/1/2005	277,184	277,184	277,184	0	485720 SRP	51	
07/08	HIRSCHBOECK, KATHERINE K	5	0	0800346B	INTEGRATING CLIMATE SCIENC	8/1/2007	7/31/2009	0	Awarded	7/29/2008	908,343	0	45,417	45,417	304270 NOAA	0	
07/08	HIRSCHBOECK, KATHERINE K	5	3	0800346A	INTEGRATING CLIMATE SCIENC	8/1/2007	7/31/2008	5,242,799	Awarded	8/31/2007	1,061,900	0	53,095	53,095	304270 NOAA	51	
07/08	HIRSCHBOECK, KATHERINE K	5	3	0800346D	INTEGRATING CLIMATE SCIENC	8/1/2007	7/31/2011	1,791,548	Awarded	8/13/2010	1,791,548	0	89,577	89,577	304270 NOAA	51.5	
09/10	HIRSCHBOECK, KATHERINE K	5	0	0800346C	VARIABILITY, SOCIAL VULNERA	8/1/2009	7/31/2010	0	Awarded	8/20/2009	1,032,761	0	51,638	51,638	304270 NOAA	0	
04/05	HUGHES, MALCOLM K	100	0	0202722C	COLLABORATIVE: RECONSTRUC	9/1/2004	8/31/2005	0	Awarded	8/19/2004	38,221	38,221	38,221	0	330220 NOAA	0	
04/05	HUGHES, MALCOLM K	100	0	0300017B	TIME-DEPENDENT BIAS IN TREE	9/1/2004	8/31/2005	0	Awarded	9/13/2004	70,378	70,378	70,378	0	335610 NOAA	0	
04/05	HUGHES, MALCOLM K	100	2	0501589A	VOLCANIC ERUPTIONS 3400-37	6/1/2005	9/30/2006	8,972	Awarded	8/24/2005	8,972	8,972	8,972	0	485770 IAP	0	
05/06	HUGHES, MALCOLM K	100	0	0600491B	COLLABORATIVE RESEARCH: A	4/1/2006	3/31/2008	0	Awarded	3/8/2007	128,857	128,857	128,857	0	354070 NSF	0	
05/06	HUGHES, MALCOLM K	100	0	0600491C	COLLABORATIVE RESEARCH: A	4/1/2006	3/31/2009	0	Awarded	1/14/2008	135,143	135,143	135,143	0	354070 NSF	0	
05/06	HUGHES, MALCOLM K	50	0	0600146B	DEVELOPING AND USING REALI	6/1/2006	5/31/2008	0	Awarded	3/19/2007	96,264	48,132	48,132	0	356070 NOAA	0	
05/06	HUGHES, MALCOLM K	100	0.08	0600491A	COLLABORATIVE RESEARCH: A	4/1/2006	3/31/2007	396,201	Awarded	3/20/2005	132,198	132,198	132,198	0	354070 NSF	50.5	
05/06	HUGHES, MALCOLM K	50	8	0600146A	DEVELOPING AND USING REALI	6/1/2006	5/31/2008	185,575	Awarded	8/28/2006	89,311	44,656	44,656	0	356070 NOAA	50.5	
07/08	HUGHES, MALCOLM K	17	2	0700106A	INTERPRETING AND REFINING I	8/1/2007	7/31/2008	89,375	Awarded	8/31/2007	53,895	0	9,162	9,162	304830 NOAA	51	
08/09	HUGHES, MALCOLM K	17	0	0700106B	INTERPRETING AND REFINING I	8/1/2008	7/31/2009	0	Awarded	5/6/2008	35,480	0	6,032	6,032	304830 NOAA	0	
08/09	HUGHES, MALCOLM K	100	8.3	0900681A	RESPONSE TO FOREST GROWTH	5/22/2009	5/21/2012	289,866	Awarded	6/1/2009	289,882	289,882	289,882	0	316170 NASA	51.5	
09/10	HUGHES, MALCOLM K	50	8.3	0900798A	LATE HOLOCENE HYDROCLIMA	8/15/2009	7/31/2012	392,838	Awarded	8/20/2009	392,838	96,419	196,419		318470 NSF	51.5	
08/09	LEAVITT, STEVEN W	10	4	0801702A	P2C2: NORTH AMERICAN MON	9/1/2008	8/31/2011	607,829	Awarded	7/29/2008	607,832	0	60,783	60,783	310450 NSF	51	
09/10	LEAVITT, STEVEN W	100	2	0901194A	INFLUENCE OF CHANGES IN TEI	12/1/2009	11/30/2011	40,000	Awarded	11/18/2009	16,000	16,000	16,000		410970 CRDF	10	
10/11	LEAVITT, STEVEN W	50															

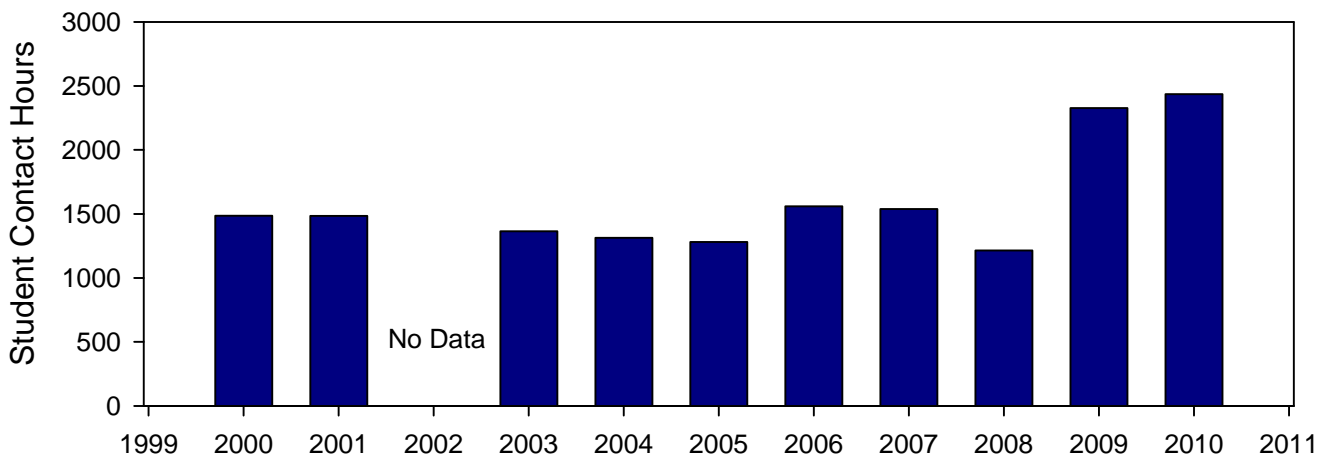
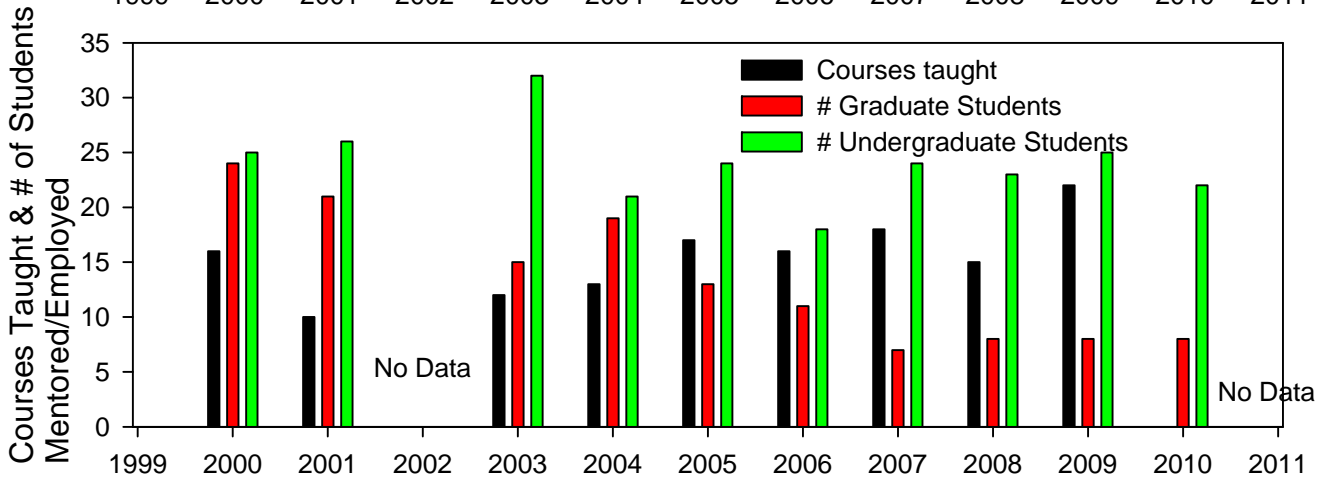
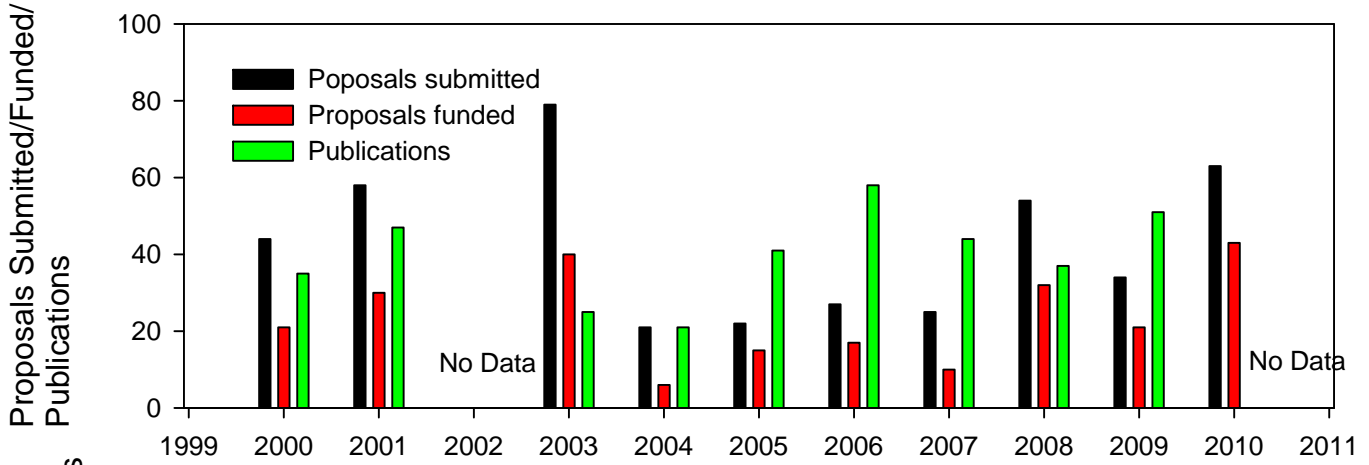
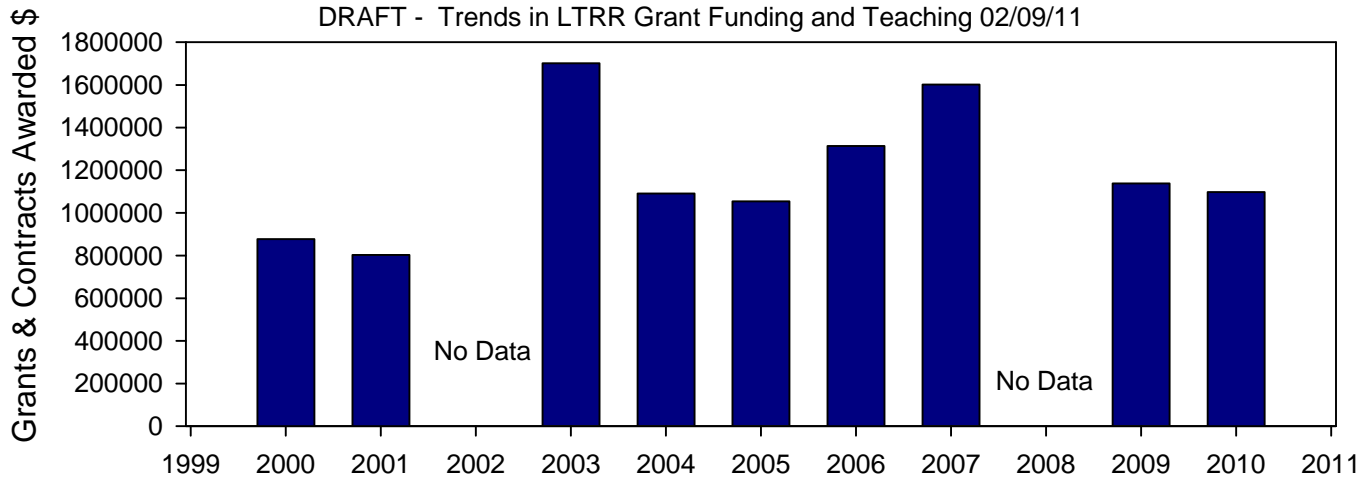


04/05	MEKO, DAVID M	25	5 0500097C	ENHANCED DROUGHT PREPARI	9/21/2004	12/31/2007	226,235	Awarded	10/18/2006	40,000	0	10,000	10,000	342360	BUREAU RE	51
04/05	MEKO, DAVID M	25	5 0500097D	ENHANCED DROUGHT PREPARI	9/21/2004	12/31/2007	71,959	Awarded	5/18/2007	71,959	0	17,990	17,990	342360	BUREAU RE	51
07/08	MEKO, DAVID M	20	2 0801064A	DETERMINE STREAM ACQUIFER	12/12/2007	9/1/2008	10,000	Awarded	1/3/2008	10,000	2,000	2,000	0	427330	AZ DWR	0
07/08	MEKO, DAVID M	19	4 0800210A	DENDROHYDROLOGIC COLLECT	8/15/2007	7/14/2008	25,000	Awarded	9/6/2007	25,000	4,750	4,750	0	304330	USGS	17.5
07/08	MEKO, DAVID M	100	9 0801944A	RIPARIAN THRESHOLDS: USING	9/3/2007	9/30/2009	14,000	Awarded	2/29/2008	14,000	14,000	14,000	0	305900	NPS	17.5
07/08	MEKO, DAVID M	100	9 0800568A	RIPARIAN THRESHOLDS: USING	9/30/2007	9/30/2009	5,200	Awarded	9/20/2007	5,200	5,200	5,200	0	305460	NPS	17.5
08/09	MEKO, DAVID M	20	7 0801702A	P2C2: NORTH AMERICAN MON	9/1/2008	8/31/2011	607,829	Awarded	7/29/2008	607,832	0	121,566	121,566	310450	NSF	51
08/09	MEKO, DAVID M	30	7 0800665A	SPATIOTEMPORAL DROUGHT V	12/1/2008	11/30/2011	370,829	Awarded	12/1/2008	370,829	111,249	111,249	0	313200	NSF	51
09/10	MEKO, DAVID M	15	3 0902516A	ENHANCED DROUGHT PREPARI	7/1/2009	9/30/2011	457,332	Awarded	7/23/2009	457,332	0	68,600	68,600	315240	BUREAU RE	17.5
09/10	MEKO, DAVID M	15	3 0902516B	ENHANCED DROUGHT PREPARI	7/1/2009	9/30/2011	50,000	Awarded	9/30/2009	50,000	0	7,500	7,500	315240	BUREAU RE	17.5
09/10	MEKO, DAVID M	100	1 1001576A	THREE-RING ANALYSIS OF NETL	3/31/2010	10/1/2012	13,425	Awarded	3/31/2010	13,425	13,425	13,425	0	323140	NPS	17.5
10/11	MEKO, DAVID M	34	8 1002174A	SACRAMENTO/KLAMATH AND:	8/1/2010	8/31/2013	399,764	Awarded	10/25/2010	135,920	46,213	46,213	0	454380	CAL DWR	51.5
10/11	PANYUSHKINA, IRINA P	50	50 1000855A	P2C2: FLICKERING CLIMATE: AS	9/15/2010	8/31/2013	597,429	Awarded	9/20/2010	298,715	149,358	149,358	0	333990	NSF	51
05/06	SALZER, MATTHEW W	100	1 0502806A	TELESCOPE PEAK ANCIENT BRIS	7/1/2005	2/15/2007	8,480	Awarded	7/5/2005	8,500	8,500	8,500	0	348590	NPS	17.5
07/08	SALZER, MATTHEW W	17	8 0700106A	INTERPRETING AND REFINING 1	8/1/2007	7/31/2008	89,375	Awarded	8/31/2007	53,895	0	9,162	9,162	304830	NOAA	51
08/09	SALZER, MATTHEW W	17	0 0700106B	INTERPRETING AND REFINING 1	8/1/2008	7/31/2009	0	Awarded	5/6/2008	35,480	0	6,032	6,032	304830	NOAA	0
09/10	SALZER, MATTHEW W	50	75 0900798A	LATE HOLOCENE HYDROCLIMA	8/15/2009	7/31/2012	392,838	Awarded	8/20/2009	392,838	196,419	196,419	0	318470	NSF	51.5
04/05	SHEPPARD, PAUL R	100	16 0401222A	DENDROCHRONOLOGICAL, VOI	8/15/2004	7/31/2006	99,879	Awarded	8/2/2004	99,879	99,879	99,879	0	406700	USFS	50.5
06/07	SHEPPARD, PAUL R	40	10 0700825A	FALLON LEUKEMIA CLUSTER...	9/15/2006	3/31/2010	160,000	Awarded	3/12/2007	160,000	0	64,000	64,000	300260	UNV RENC	51
04/05	SWETNAM, THOMAS W	100	1 0500434A	EXTENSION TO THE INTERNATI	9/7/2004	9/30/2006	3,000	Awarded	9/8/2004	3,000	3,000	3,000	0	342030	USFS	0
04/05	SWETNAM, THOMAS W	100	24 0402810A	A FIRE-CLIMATE SYNTHESIS IN 1	8/1/2004	12/31/2006	48,979	Awarded	10/20/2004	48,979	48,979	48,979	0	340920	USGS	17.5
06/07	SWETNAM, THOMAS W	10	5 0602019A	HYDE PARK/LITTLE TESUQUE W	8/7/2006	9/30/2009	321,132	Awarded	8/7/2006	321,132	32,113	32,113	0	357230	USFS	10
06/07	SWETNAM, THOMAS W	100	9 0700156A	RESPONSE WESTERN MOUNTA	9/15/2006	3/15/2008	29,503	Awarded	8/11/2006	29,218	29,218	29,218	0	357320	NPS	17.5
06/07	SWETNAM, THOMAS W	100	100 0601430A	MULTI-CENTURY RECONSTRUC	8/18/2006	7/7/2009	130,000	Awarded	8/28/2006	130,000	130,000	130,000	0	356110	USFS	20
06/07	SWETNAM, THOMAS W	10	8 0601431A	FIRE REGIMES ON MONTANE G	10/1/2006	9/30/2009	224,989	Awarded	2/1/2007	224,989	22,499	22,499	0	420530	VCT	20
07/08	SWETNAM, THOMAS W	30	1 0800462D	GROWTH AND DEMOGRAPHY C	9/4/2007	6/1/2011	46,596	Awarded	9/14/2009	46,956	0	14,087	14,087	304930	USFS	0
07/08	SWETNAM, THOMAS W	30	0 0800462E	GROWTH AND DEMOGRAPHY C	9/4/2007	9/4/2012	35,000	Awarded	8/13/2010	35,000	0	10,500	10,500	304930	USFS	0
07/08	SWETNAM, THOMAS W	15	1 0802231A	FIRE-SCAPE	5/5/2008	9/30/2008	35,000	Awarded	5/6/2008	35,000	0	5,250	5,250	307520	USFS	10
07/08	SWETNAM, THOMAS W	15	1 0802231B	FIRE-SCAPE	5/5/2008	9/30/2008	100,000	Awarded	7/31/2008	100,000	0	15,000	15,000	307520	USFS	10
07/08	SWETNAM, THOMAS W	100	2 0900156A	EXPLORING INTEGRATED NATU	6/1/2008	3/15/2010	10,000	Awarded	8/1/2008	10,000	10,000	10,000	0	309440	NPS	17.5
09/10	SWETNAM, THOMAS W	50	4 0901218A	FIRE AND CLIMATE CHANGE IN	8/17/2009	12/31/2010	285,624	Awarded	9/3/2009	285,625	142,813	142,813	0	317750	USFS	0
09/10	SWETNAM, THOMAS W	50	4 0901218B	FIRE AND CLIMATE CHANGE IN	8/17/2009	4/30/2011	20,700	Awarded	8/20/2010	20,700	10,350	10,350	0	317750	USFS	0
09/10	SWETNAM, THOMAS W	10	10 1000259A	ASSESSING FOREST AGE STRUC	9/2/2009	9/30/2011	61,000	Awarded	9/14/2009	61,000	6,100	6,100	0	319480	USFS	0
09/10	SWETNAM, THOMAS W	80	4 1002332A	DENDROCHRONOLOGY BASED	6/11/2010	6/30/2010	36,590	Awarded	6/11/2010	36,590	29,272	29,272	0	325430	USFS	0
09/10	SWETNAM, THOMAS W	80	4 1002332B	DENDROCHRONOLOGY BASED	6/11/2010	6/30/2011	112,170	Awarded	8/20/2010	112,170	89,736	89,736	0	325430	USFS	0
09/10	SWETNAM, THOMAS W	25	1 1000392A	CORONADO NATIONAL FOREST	8/31/2009	1/31/2014	270,000	Awarded	9/4/2009	270,000	0	67,500	67,500	318520	USFS	10
09/10	SWETNAM, THOMAS W	15	1 1000392B	CORONADO NATIONAL FOREST	8/31/2009	1/31/2014	290,000	Awarded	9/4/2009	290,000	0	43,500	43,500	318520	USFS	10
09/10	SWETNAM, THOMAS W	70	0.01 1000262A	FINGERPRINTING CAUSES OF IN	8/15/2009	11/30/2010	31,469	Awarded	9/12/2009	24,363	17,054	17,054	0	320100	NPS	17.5
10/11	SWETNAM, THOMAS W	50	2 1100106A	AN ASSESSMENT OF CURRENT I	7/15/2010	9/30/2012	49,921	Awarded	9/9/2010	24,961	12,481	12,481	0	334130	NPS	17.5
05/06	TOUCHAN, RAMZI	100	0 0602638B	EUROPEAN CLIMATE OF THE LA	6/1/2006	5/31/2007	0	Awarded	10/3/2006	1,056	1,056	1,056	0	490760	U WALES	0
05/06	TOUCHAN, RAMZI	100	15 0602638A	EUROPEAN CLIMATE OF THE LA	6/1/2006	5/31/2007	83,257	Awarded	9/1/2006	78,056	78,056	78,056	0	490760	U WALES	50.5
07/08	TOUCHAN, RAMZI	62	13 0800210A	DENDROHYDROLOGIC COLLECT	8/15/2007	7/14/2008	25,000	Awarded	9/6/2007	25,000	15,500	15,500	0	304330	USGS	17.5
08/09	TOUCHAN, RAMZI	20	12.5 0801702A	P2C2: NORTH AMERICAN MON	9/1/2008	8/31/2011	607,829	Awarded	7/29/2008	607,832	0	121,566	121,566	310450	NSF	51
08/09	TOUCHAN, RAMZI	70	15 0800665A	SPATIOTEMPORAL DROUGHT V	12/1/2008	11/30/2011	370,829	Awarded	12/1/2008	370,829	259,580	259,580	0	313200	NSF	51
10/11	TOUCHAN, RAMZI	33	8 1002174A	SACRAMENTO/KLAMATH AND:	8/1/2010	8/31/2013	399,764	Awarded	10/25/2010	131,922	43,534	43,534	0	454380	CAL DWR	51.5
04/05	TOWNER, RONALD H	100	0.04 0501633A	DENDROCHRONOLOGICAL INVI	2/1/2005	12/31/2005	4,948	Awarded	3/8/2005	4,948	4,948	4,948	0	345050	NSF	0
05/06	TOWNER, RONALD H	100	0 0501780B	DENDROARCHAEOLOGY OF THI	5/4/2006	7/31/2007	0	Awarded	5/9/2006	98,019	98,019	98,019	0	349370	NPS	0
05/06	TOWNER, RONALD H	100	21 0501780A	DENDROARCHAEOLOGY OF THI	8/1/2005	7/31/2006	195,651	Awarded	8/3/2005	97,632	97,632	97,632	0	349370	NSF	50.5
07/08	TOWNER, RONALD H	35	8.5 0701019A	SOUTHWESTERN ARCHAEOLOC	8/1/2007	7/31/2008	239,534	Awarded	8/1/2007	239,534	83,837	83,837	0	303830	NSF	51
07/08	TOWNER, RONALD H	100	100 0800310A	DENDROARCHAEOLOGY AND EA	6/1/2008	5/31/2010	179,497	Awarded	2/5/2008	179,497	179,497	179,497	0	307050	NSF	51
09/10	TOWNER, RONALD H	100	0 1002498B	TREE-RINGS, HISTORICAL DOCL	5/22/2010	9/30/2015	0	Awarded	9/20/2010	11,000	11,000	11,000	0	326090	BLM	0
09/10	TOWNER, RONALD H	100	13 1002498A	TREE-RINGS, HISTORICAL DOCL	5/22/2010	9/30/2015	19,988	Awarded	7/29/2010	10,000	10,000	10,000	0	326090	BLM	17.5
10/11	TOWNER, RONALD H	100	0.21 1001697A	ARCHAEOLOGICAL CHRONOLOG	7/15/2010	6/30/2011	136,304	Awarded	7/15/2010	68,152	68,152	68,152	0	327720	NSF	51.5
10/11	TOWNER, RONALD H	50	0.15 1000957A	SOUTHWEST ARCHAEOLOGICAL	9/1/2010	8/31/2011	79,981	Awarded	9/1/2010	39,991	19,996	19,996	0	333720	NSF	51.5
06/07	WOODHOUSE, CONNIE A	100	4 0702324A	DECISION SUPPORT FOR DEFINI	3/30/2007	3/29/2008	71,195	Awarded	4/18/2007	71,195	0	71,195	71,195	422460	SCI FND AZ	10
07/08	WOODHOUSE, CONNIE A	13	3 0800210A	DENDROHYDROLOGIC COLLECT	8/15/2007	7/14/2008	25,000	Awarded	9/6/2007	25,000	3,250	3,250	0	304330	USGS	17.5
07/08	WOODHOUSE, CONNIE A	6	1 0800210A	DENDROHYDROLOGIC COLLECT	8/15/2007	7/14/2008	25,000	Awarded	9/6/2007	25,000	1,500	1,500	0	304330	USGS	17.5
07/08	WOODHOUSE, CONNIE A	13	1 0700106A	INTERPRETING AND REFINING 1	8/1/2007	7/31/2008	89,375	Awarded	8/31/2007	53,895	0	7,006	7,006	304830	NOAA	51
07/08	WOODHOUSE, CONNIE A	31	1 0700106A	INTERPRETING AND REFINING 1	8/1/2007	7/31/2008	89,375	Awarded	8/31/2007	53,895	0	16,707	16,735	304830	NOAA	51
08/09	WOODHOUSE, CONNIE A	31	0 0700106B	INTERPRETING AND REFINING 1	8/1/2008	7/31/2009	0	Awarded	5/6/2008	35,480	0	10,999	10,999	304830	NOAA	0
08																

09/10	WOODHOUSE, CONNIE A	30	1.16	1000406A	ARKANSAS RIVER BASIN RECON	10/19/2009	12/31/2009	4,927	Awarded	10/27/2009	4,927	0	1,478	1,478	443550	CO SPRING	8
09/10	WOODHOUSE, CONNIE A	30	0.6	1000406B	ARKANSAS RIVER BASIN RECON	10/19/2009	9/30/2010	3,609	Awarded	5/21/2010	3,609	0	1,083	1,083	443550	CO SPRING	8
09/10	WOODHOUSE, CONNIE A	70	1.4	1000406B	ARKANSAS RIVER BASIN RECON	10/19/2009	9/30/2010	3,609	Awarded	5/21/2010	3,609	0	2,526	2,526	443550	CO SPRING	8
09/10	WOODHOUSE, CONNIE A	5	0	0902516A	ENHANCED DROUGHT PREPARI	7/1/2009	9/30/2011	457,332	Awarded	7/23/2009	457,332	0	22,867	22,867	315240	BUREAU RE	17.5
09/10	WOODHOUSE, CONNIE A	10	3	0902516A	ENHANCED DROUGHT PREPARI	7/1/2009	9/30/2011	457,332	Awarded	7/23/2009	457,332	0	45,733	45,733	315240	BUREAU RE	17.5
09/10	WOODHOUSE, CONNIE A	5	0	0902516B	ENHANCED DROUGHT PREPARI	7/1/2009	9/30/2011	50,000	Awarded	9/30/2009	50,000	0	2,500	2,500	315240	BUREAU RE	17.5
09/10	WOODHOUSE, CONNIE A	10	3	0902516B	ENHANCED DROUGHT PREPARI	7/1/2009	9/30/2011	50,000	Awarded	9/30/2009	50,000	0	5,000	5,000	315240	BUREAU RE	17.5
09/10	WOODHOUSE, CONNIE A	3.5	1	0900775A	THIS PROJECT WILL ASSESS HO	8/1/2009	1/30/2011	122,559	Awarded	9/30/2009	76,309	0	2,671	2,671	317260	NOAA	51.5
09/10	WOODHOUSE, CONNIE A	1.5	1	0900775A	THIS PROJECT WILL ASSESS HO	8/1/2009	1/30/2011	122,559	Awarded	9/30/2009	76,309	0	1,145	1,145	317260	NOAA	51.5
10/11	WOODHOUSE, CONNIE A	23	2.8	1002174A	SACRAMENTO/KLAMATH AND :	8/1/2010	8/31/2013	399,764	Awarded	10/25/2010	91,946	21,148	21,148	0	454380	CAL DWR	51.5
10/11	WOODHOUSE, CONNIE A	10	1.2	1002174A	SACRAMENTO/KLAMATH AND :	8/1/2010	8/31/2013	399,764	Awarded	10/25/2010	39,976	3,998	3,998	0	454380	CAL DWR	51.5

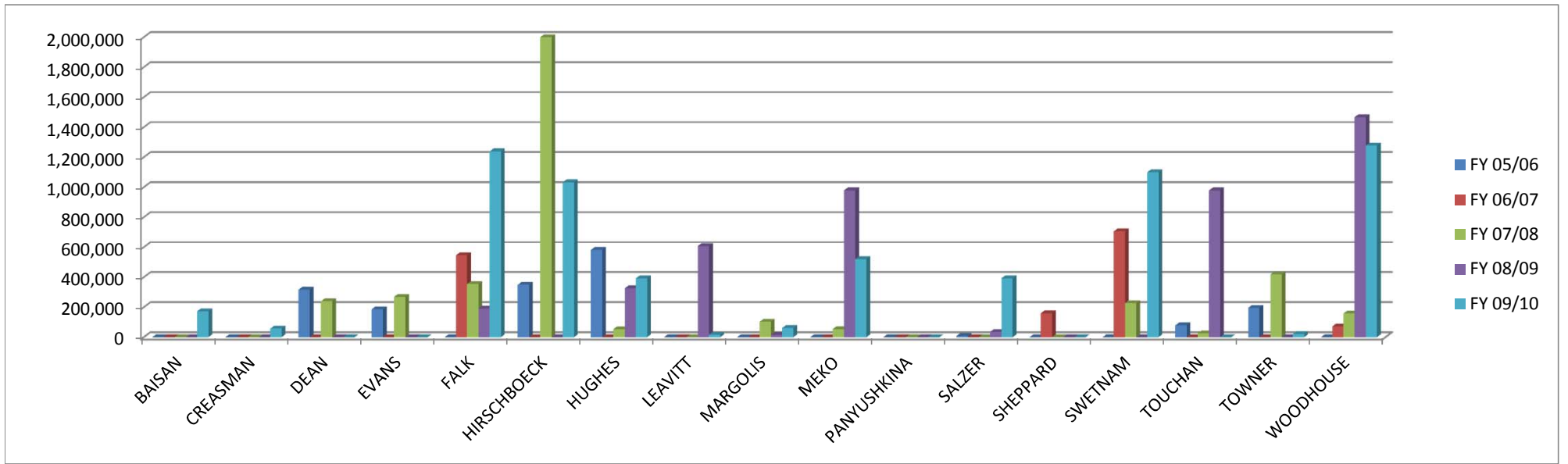
	TOTALS:	Awd Amt	PI Awd Amt TRL	PI AWD Amt all
BAISAN, CHRISTOPHER H		173,123	37,061	37,061
CREASMAN, PEARCE PAUL		57,000	57,000	57,000
DEAN, JEFFREY S		870,321	430,174	534,559
EVANS, MICHAEL N		454,776	169,201	296,989
FALK, DONALD A		2,356,888	657,152	1,565,296
HIRSCHBOECK, KATHERINE K		5,143,736	349,184	588,912
HUGHES, MALCOLM K		1,471,439	992,858	1,108,051
LEAVITT, STEVEN W		922,547	165,358	226,141
MARGOLIS, ELLIS Q		178,337	172,237	172,237
MEKO, DAVID M		1,964,997	260,837	502,412
PANYUSHKINA, IRINA P		298,715	149,358	149,358
SALZER, MATTHEW W		490,713	204,919	220,113
SHEPPARD, PAUL R		259,879	99,879	163,879
SWETNAM, THOMAS W		2,109,683	583,614	739,451
TOUCHAN, RAMZI		1,214,695	397,727	519,293
TOWNER, RONALD H		748,773	573,080	573,080
WOODHOUSE, CONNIE A		3,104,495	29,895	533,975

DRAFT - Trends in LTRR Grant Funding and Teaching 02/09/11



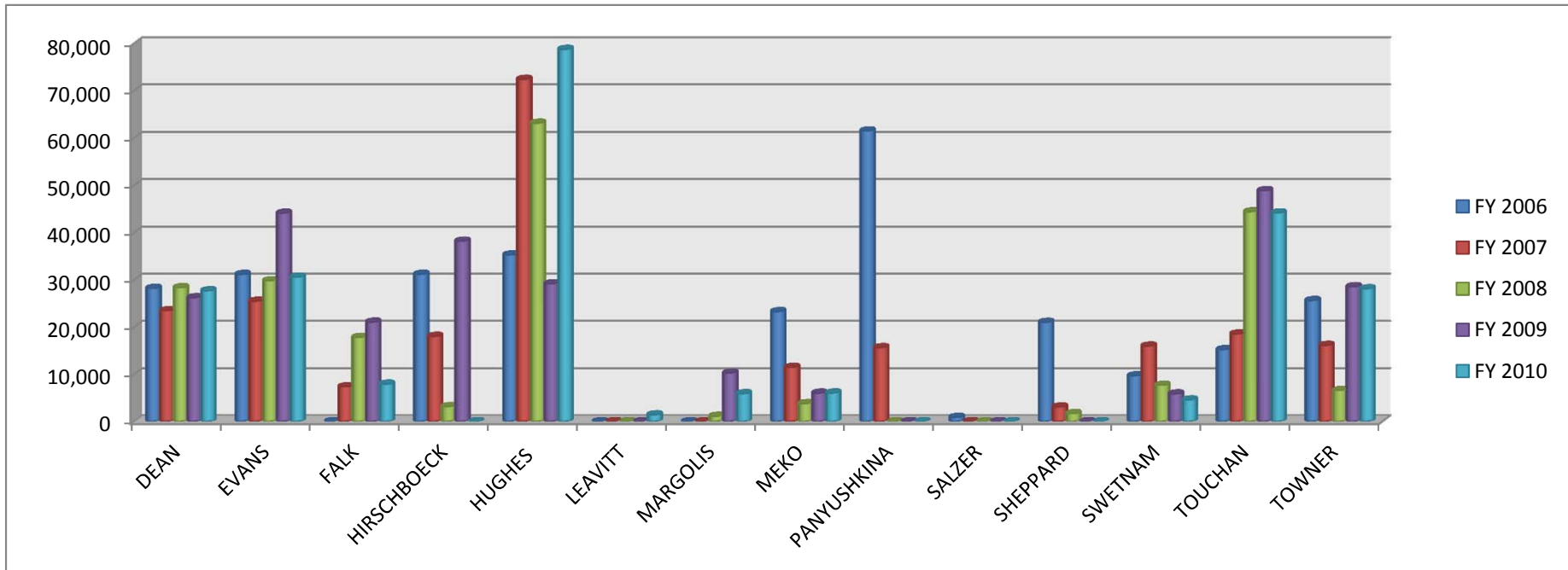
**GRANTS AND CONTRACTS BY FISCAL YEAR AND PI**

	FY 05/06		FY 06/07		FY 07/08		FY 08/09		FY 09/10	
	TOTAL AWARD	PI AWARD AMT	TOTAL AWARD	PI AWARD BY %	TOTAL AWARD	PI AWARD BY %	TOTAL AWARD	PI AWARD BY %	TOTAL AWARD	PI AWARD BY %
BAISAN	0	0	0	0	0	0	0	0	173,123	37,061
CREASMAN	0	0	0	0	0	0	0	0	57,000	57,000
DEAN	316,320	104,386	0	0	239,534	155,697	0	0	0	0
EVANS	185,575	87,788	0	0	269,201	209,201	0	0	0	0
FALK	0	0	546,121	491,509	355,184	310,347	191,564	162,564	1,239,058	507,733
HIRSCHBOECK	349,184	349,184	0	0	3,761,791	188,090	0	0	1,032,761	51,638
HUGHES	581,773	488,986	0	0	53,895	9,162	325,362	289,882	392,838	96,419
LEAVITT	0	0	0	0	0	0	607,832	60,783	16,000	16,000
MARGOLIS	0	0	0	0	102,337	102,337	15,000	15,000	61,000	54,900
MEKO	0	0	0	0	54,200	25,950	978,661	232,815	520,757	13,425
PANYUSHKINA	0	0	0	0	0	0	0	0	0	0
SALZER	8,500	8,500	0	0	0	0	35,480	6,032	392,838	196,419
SHEPPARD	0	0	160,000	64,000	0	0	0	0	0	0
SWETNAM	0	0	705,339	213,830	226,956	54,837	0	0	1,100,448	295,325
TOUCHAN	79,112	79,112	0	0	25,000	15,500	978,661	381,146	0	0
TOWNER	195,651	195,651	0	0	419,031	263,334	0	0	21,000	21,000
WOODHOUSE	0	0	71,195	71,195	157,790	28,492	1,466,734	318,407	1,276,854	90,764



### LTRR IDC TO UA PER YEAR BY PI

	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
DEAN	28,232	23,497	28,383	26,256	27,724
EVANS	31,195	25,508	29,833	44,141	30,612
FALK	0	7,393	17,855	21,092	7,954
HIRSCHBOECK	31,210	18,070	3,193	38,225	0
HUGHES	35,318	72,426	63,161	29,209	78,749
LEAVITT	0	0	0	0	1,455
MARGOLIS	0	0	1,153	10,280	5,931
MEKO	23,302	11,502	3,833	6,055	6,080
PANYUSHKINA	61,526	15,681	0	0	0
SALZER	915	0	0	0	0
SHEPPARD	21,044	3,105	1,718	0	0
SWETNAM	9,723	16,013	7,720	5,896	4,618
TOUCHAN	15,260	18,572	44,443	48,910	44,198
TOWNER	25,663	16,155	6,616	28,588	28,151



# Bachelor's of Environmental Science Degree Guidelines (DRAFT Dec 2010)

## COURSEWORK

The Bachelor of Environmental Science Degree comprises general education, core, and focal area classes typically taken over eight semesters. A suggested course sequence is listed at the end of this brochure.

**Note: Some classes have prerequisite requirements; it is important to check the U of A online Schedule of Classes (<http://garnet.ccit.arizona.edu/cgi-bin/schedule/schedule.cgi>) to confirm course availability and class prerequisites.**

**GENED Total: 35 Units**

**CORE Total: 69-71 units**

General Science Core: 34

Environmental Science Core: 26-27

Career Preparation: 9-10

**A. General Education.** These classes give undergraduates a diverse academic background to complement each major.

<b><u>Foundation Courses</u></b> English Composition Mathematics (satisfied by MATH 124/125)	6 Units	<b><u>Tier 1</u></b> Traditions and Cultures Individuals and Societies	6 Units 6 Units
<b><u>Pre-Major</u></b> Communications (satisfied by SWES 408)		<b><u>Tier 2</u></b> Humanities Arts Individuals and Societies	3 Units 3 Units 3 Units
<b><u>Second Language</u></b> Second semester proficiency	variable		

## General Science Core (34 Units)

Courses	Units	Fall	Spring
CHEM 151, 152, Intro Chemistry I & II	8	X	X
CHEM 241A, & 243A Organic Chemistry	4	X	X
MATH 124 Calculus I with Applications OR MATH 125 Calculus I	5 3	X X	X X
MATH 263 Statistics OR MATH 363 Intro to Stat Methods OR MGMT 276 Stat Inference OR PSYC 230 Psych Meas & Stats	3 3 3 3	X X X X	X X X X
MCB 181R/L, 182 R Intro Biology	7	X	X
MIC 205 A Intro Microbiology	3	X	X
PHYS 131 Physics*	4	X	

\*PHYS 142 Intro Optics & Thermodynamics instead for Water Resource Management focus

## C. Environmental Science Core (26-27 units, 18-23 upper division units)

Courses	Units	Fall	Spring
ECOL 302 Ecology* OR RNR 316 Nat Res Ecology OR SWES 425 Env Microbiology OR SWES 474 Aquatic Plants & The Environ OR SWES 475 Freshwater & Marine Algae	4 3 3 4 4	X X X X	    X
GEOS 251 Physical Geology	4	X	X
SWES 420 Env Physics OR ATMO 336 Weather, Climate & Society	3 3	X X	
HWR 250 Principles of Hydrology OR WSM 460 Watershed Hydrology	3 3	X X	
SWES 200/201 Intro Soils	4	X	X
SWES 462 Env Soil & Water Chem OR HWR 417A Fundamentals of Water Quality	3 3	 X	X
SWES 305 Pollution Science	3		X
SWES 418 Human Health Risk Assessment OR HWR 443A Risk Assessment for Env Sys	3 3	 X	X

\*Required in Biosphere Science & Ecology Focal Areas; select other course here

## D. Career Preparation Courses (9-10 units, 6-7 upper division units)

Courses*	Units	Fall	Spring
SWES 210 Fund Env Sci & Sustainability	3	X	X
SWES 408 Technical Writing OR SWES 415 Translating Env Sci OR ENGL 308 Technical Writing	3 3 3	  X	X X
SWES 430R/L Env Monitor/Remed. (Capstone) OR SWES 461 Soil/Water Cons (Capstone)	4 3		X Pre-ssn

\* SWES 195A Careers in Environmental Science is also highly recommended

## Core Prerequisite Courses

Core Class	Prerequisite Courses	Core Class	Prerequisite Courses
CHEM 151	MATH 112 or MATH 120	PHYS 141	MATH 124
MATH 124	MATH 111 & 112, or MATH 120R	SWES 200	CHEM 151
MATH 263	MATH 112	SWES 415	ENGL 102 (A or B grade), any MATH class
MCB 181R/L	MATH 112 or MATH 120		
MIC 205A/L	CHEM 151, MCB 181R		

## E. Environmental Science Focal Area Coursework.

Students may pursue one of the following.

### 1. Atmospheric Science

Courses within this focus area are designed primarily as preparation for an atmospheric sciences graduate degree at the M.S. or Ph.D. level. It is also possible for a student to satisfy the course requirements for employment as a meteorologist in the National Weather Service with a BES. degree.

For further information contact:

Dr Chris Castro 520-626-5617 castro@atmo.arizona.edu

(18 units upper division)

<b>Required Courses (15 units)</b>	<b>Options (3 units)</b>
ATMO 436: Fundamentals of Atmo Sci (3) II	ATMO 471: Synoptic Meteorology (3) I
ATMO 451A: Physical Meteorology I (3) I	ATMO 421: Physical Climatology (3) I
ATMO 441A: Dynamic Meteorology I (3) I	ATMO 469a: Air Pollution I: Gases (3) I
ATMO 451B: Physical Meteorology II (3) II	ATMO 489: Atmospheric Electricity (3) II
ATMO 444B: Dynamic Meteorology II (3) II	ATMO 490: Remote Sensing of Planet Earth (3) II
	ATMO 469b: Air Pollution II: Aerosols (3) II

Students must complete following prerequisites:

MATH 129: Calculus II

MATH 254: Intro to Ordinary Differential Eq

PHYS 141: Intro Mechanics

PHYS 142: Intro Optics & Thermodynamics

### 2. Biosphere Science

This focus concerns the Earth as an integrated and interacting system composed of land surfaces, water, air, and biology that both influences and is influenced by humans. The goal of this focus area is to yield an appreciation of how the interaction of systems contributes to the past, current, and future states of the Earth and offer students classroom knowledge, laboratory skills, and field experience. This focus was developed with Biosphere 2.

For further information contact:

Dr. Mitchell Pavao-Zuckerman, Dr. Greg Barron-Gafford, Dr. Stephen DeLong, Dr. Katerina Donstova

(18 units upper division)

<b>Required Courses (10 units)</b>	<b>Options (6 units)</b>
ECOL 302 Ecology (4) I	ECOL 310 Living in Symbiosis (3) I
HWR 436A Fund of Atmo Sci (3) II	GEOS 342 Evol of Earth, Ocean, and Atmo (3) I
SWES 456A Watersheds/Ecosys Function (3) II	GEOS 412 Ocean Science (4) II
	GEOS 466 Stable Iso Geochem & Paleoclimate (3) I
	GEOS 478 Global Change (3), I
	RNR 384 Nat Resource Manage (3) II
	RNR 403 Appl Geog Info Sys (3), I
	RNR 417 GIS for Natural & Social Sci (3), I
<b>Choose One (3-4 units)</b>	SWES 330 Intro to Remote Sensing (3), I
SWES 431 Soil Genesis, Morph/Taxon (3) I	SWES 453 Remote Sensing of the Env (3), I
GEOS 450 Geomorph (4) II	SWES 461 Soil/Water Cons (3) Pre-session/odd yrs
	GEOS 450 - Geomorphology (Fall 4 units)
	GEOS 453 - Glacial & Quaternary Geol (3) II
	SWES 456A - Watershed & Ecosys Function (3) II
	WSM 473 - Spatial Analysis & Modeling (3) I
	SWES 425 - Environmental Microbiology (3) I
	SWES 426 Env. Micro. Lab (2) I



### 3. Chemistry

This focus integrates physical and chemical sciences within a quantitative framework applied to the environment. It includes the study of sources, reactions, transport, effects and fates of chemical species in water, soil, air, and living environments.

For further information contact:

Dr. Joan Curry, 626-5081, [curry@ag.arizona.edu](mailto:curry@ag.arizona.edu)

Dr. Jon Chorover, 626-5635, [chorover@ag.arizona.edu](mailto:chorover@ag.arizona.edu)

(18 units upper division)

<b>Required Courses (9 units)</b>	<b>Options (9 units)</b>
CHEM 322 Principles of Analysis I (2) II, Sum CHEM 323 Principles of Analysis I Lab (1) II CHEM 480A Physical Chemistry (3) I, II SWES 464 Environ Chemistry (3) I	CHEM 404 Inorganic Chem (3) I CHEE 400R Water Chem for Engr (3) I CHEE 400L Water Chem for Engr (Lab) (1) I,II CHEE 478 Intro to Hazardous Waste Mgmt (3) II GEOS 400 Intro to Geochemistry (3) I MSE 412 Physical Chemistry of Materials (3) I PTY5 407 Chemistry of the Solar System (3) I SWES 401 Mgt Arid Land/Salt Soils (3) II (even years) SWES 431 Soil Genesis, Morph/Taxon (3) I

Students must complete following prerequisites:

MATH 129 Calculus II (3) I,II

PHYS 103 Intro Physics II (3) I, II, Sum, or PHYS 241 Intro Electricity & Mag (4) I, II, Sum

### 4. Communication & Education

This focal area trains students to bridge the communication gap between the applications and nomenclature of cutting-edge environmental technology and the perceptions of the lay public.

For further information contact:

Dr. Melanie Lenart 792-8736 [melenart@email.arizona.edu](mailto:melenart@email.arizona.edu)

Dr. Tom Wilson 621-9308 [twilson@ag.arizona.edu](mailto:twilson@ag.arizona.edu)

(18 Units upper division)

<b>Required Courses (9 units)</b>	<b>Options (3 units)</b>
A ED 422 Comm Knowledge in Ag & Life Sci (3) I PHIL 323 Environmental Ethics (3) I, II, SUM PSYC 374 Environmental Psychology (3)	AREC 476 Env Law & Economics (3) II ED P 310 Learning in the Schools (3) I, II ED P 340 Research in Education (3) I, II GEOG 461 Env & Resource Geog (3) II GEOS 478 Global Change (3) I STCH 250 Teaching Science (3) I, II SWES 444 Applied Env Law (3) I TTE 350 Schooling in America (3) I, II, SUM
<b>Select one (3 units)</b> SWES 408 Technical Writing (3) II SWES 415 Translating Env Science (3) II	
<b>Select one (3 units)</b> HIST 355 US Environmental History (3) II HIST 356 Global Environmental History (3) II	

## 5. Ecology

This focus centers on how living organisms, populations, communities, and ecosystems interact with their environment. It gives students basic grounding in ecological principles. It considers agricultural and aquacultural impacts on the environment, use of plants to clean up the environment (phytoremediation), global change, and management of freshwater and marine systems.

For further information contact:

Dr. Kathy Godwin, 626-3283, [kgodwin@email.arizona.edu](mailto:kgodwin@email.arizona.edu)

(18 units upper division)

<p><b>Required course (4 units)</b> ECOL 302 Ecology (4) I</p>	<p><b>Options (continued)</b> ECOL 485 Mammalogy (4) I ECOL 487 Animal Behavior (4) I EIS 415R Insect Biology (3) I</p>
<p><b>Select two (8 units)</b> ECOL 320 Genetics (4) ECOL 335 Evolutionary Biology (4) II ECOL 406R/L Conservation Biology (4)</p>	<p>GEOS 412 Ocean Sciences (4) II GEOS 478 Global Change (3), I RNR 316 Natural Resources Ecology (3) RNR 355 Introduction to Wildland Fire (3) RNR 384 Natural Resource Management (3)</p>
<p><b>Options (6 units)</b> ECOL 310 Living in Symbiosis (3) ECOL 330 Evol Animal Form &amp; Function (3-4) ECOL 340 Evolution Plant Form and Function (3) ECOL 380 Mathematic Models in Biology (3) ECOL 404R/L Biology of the Oceans (3/1) I ECOL 482 Ichthyology (4) I ECOL 483 Herpetology (4) II ECOL 484 Ornithology (4) I</p>	<p>RNR 403 Applied Geographic Information Systems (3) SWES 316 Soil Fertility/Plant Nutrition (3) SWES 425 Environmental Microbiology (3) SWES 431 Soil Genesis, Morph/Taxon (3), I SWES 453 Remote Sensing of the Environment (3) SWES 456A Watersheds &amp; Ecosystems Function (3) SWES 474 Aquatic Plants in the Environment (4) I SWES 475 Freshwater &amp; Marine Algae (4), II WFSC 441 Limnology (4) I</p>

## 6. Environmental Change

This focus emphasizes environmental change through time. It includes the study and reconstruction of past environments, the evaluation of current environments in the context of long-term change, and the projection for future change.

For further information contact:

Dr Paul Sheppard, 621-6474, [Sheppard@ltrr.arizona.edu](mailto:Sheppard@ltrr.arizona.edu)

Dr Pearce Paul Creaseman, 621-2414, [pcreaseman@ltrr.arizona.edu](mailto:pcreaseman@ltrr.arizona.edu)

(18 units upper division)

<p><b>Required course (7 units)</b> GEOS 439A Intro. to Dendrochronology (4) I GEOS 478 Global Change (3) I</p>	<p><b>Options (at least 5 units)</b> ANTH 307 Ecological Anthropology (3) I ANTH 418 Southwest Land and Society (3) II</p>
<p><b>Select one (3 units)</b> HIST 355 U.S. Environmental History (3), II HIST 356 Global Environmental History (3) II</p>	<p>ATMO 421C Physical Climatology: Mechanisms of Change (3) II GEOG 408 Arizona and the Southwest (3) I</p>
<p><b>Select one (3 units)</b> ANTH 332 Environmental Archaeology (3) II GEOS 462 Intro. to Quaternary Ecology (3) I</p>	

## 7. Geosciences

This focus area allows integration of environmental principles and ongoing issues, learned in the core of the Environmental Sciences degree, into a framework of Geoscience studies on land and in the ocean.

For further information contact:

Dr P. Jonathan Patchett, 621-2070, [patchett@email.arizona.edu](mailto:patchett@email.arizona.edu)

(18 units upper division)

### **Required Courses (18 units)**

GEOS-302 Stratigraphy & Sedimentation (4) I  
GEOS-342 Evolution of Earth, Ocean, Atmosphere (3) I  
GEOS-412A Ocean Sciences (4) II  
GEOS-478 Global Change (3) I  
GEOS-450 Geomorphology (4) II

## 8. Microbiology

This focus primarily addresses issues such as the remediation of contaminated sites and natural processes of decomposition, as well as water and food quality (pathogens).

For further information contact:

Dr. Raina Maier, 621-7231, [rmaier@ag.arizona.edu](mailto:rmaier@ag.arizona.edu)

Dr. Ian Pepper, 626-3328, [ipepper@ag.arizona.edu](mailto:ipepper@ag.arizona.edu)

Dr. Christopher Rensing, 626-8482, [rensingc@ag.arizona.edu](mailto:rensingc@ag.arizona.edu)

(18 Units upper division)

### **Required Courses (5 units)**

SWES 425 Environmental Microbiology (3) I  
SWES 426 Env. Micro. Lab (2) I

### **Select one (4 units)**

BIOC 462a Biochemistry (4) I  
ECOL 320 Genetics (4) I, II

### **Options (9 units)**

BIOC 462a Biochemistry (4-5) I  
BIOC 460 Gen Prot & Gen Metab Biochem (3) I, II, SUM  
ECOL 320 Genetics (4) I, II  
MCB 411 Molecular Biology (3-4) I, II  
MCB 473 Recomb DNA Methods/Appl (4) I, II  
MIC 328R Microbial Physiology (3) II  
MIC 421b Microbiological Techniques (3) II  
SWES 440 Biodeg of Pollutants (3) II (even years)  
SWES 475 Freshwater and Marine Algae (4) II  
WFSC 441 Limnology (4) I

Students must complete following prerequisites:

CHEM 241b Organic Chemistry (3) I, II (for BIOC & MIC courses)

ECOL 182 Intro. to Biol 2 (3), I, II (for ECOL & MCB courses)

## 9. Natural Resources

This focus area introduces students to applications of physical and biological science for the conservation and management of natural resources (e.g., wildlife, rangelands, water, and forests).

For further information contact:

Dr William Matter, 621-7280, [wmatter@ag.arizona.edu](mailto:wmatter@ag.arizona.edu)

(18 units upper division)

<b>Options (18 units)</b>	<b>Options (continued)</b>
RNR 316 Nat Res Ecology (3) I	RA M 436a Grazing Ecol & Manage (2) II
RNR 321 Nat Res – Measure (3) II	RA M 446 Veg Manage of Wildlands (3) II
RNR 351 Ecosys Serv: Sci & Manage (3) I	RA M 456a Rangeland Invent & Mon (3) I
RNR 355 Intro to Wildland Fire (3) I	WFSC 441 Limnology (4) I
RNR 403 Appl of GIS (3) I, II	WFSC 444 Wildlife Manage Mammal Sp (4) I
RNR 417 GIS Nat & Soc Sci (3) I, II	WFSC 446 Wildlife Manage Avian Sp (4) II
RNR 406 R/L Cons Biol (4) II	WFSC 455 R/L Fishery Manage (4) II
RNR 448 Outdoor Rec Manage (2-3) II	WSM 452 Dryland Ecohydro & Veg Dyn (3) I
RNR 480 Nat Res - Policy & Law (3) II	WS M 462 Watershed Manage (3) II
RNR 485 Nat Res - Econ & Planning (3) I	WS M 468 Wildland Water Quality (3) II
RA M 382 Range Plant Comm of West (3) II	GEOG 438 Biogeography (3) I

Students must complete the following prerequisite for RAM 382:

RNR 230 R/L Native Plant Taxonomy (3) I

## 10. Pollution Science Focus

This focus was developed with the Chemical and Environmental Engineering Department. It prepares students to deal with environmental pollution and to solve complex environmental problems requiring an interdisciplinary background.

For further information contact:

Dr. Mark L. Brusseau, 621-3244, [brusseau@ag.arizona.edu](mailto:brusseau@ag.arizona.edu)

(18 Units upper division)

<b>Required courses (6 units)</b>	<b>Options (6 units)</b>
SWES 464 Environmental Chemistry (3) I	ATMO 469A Air Pollution I: Gases (3) I
CHEM 480a Physical Chemistry (3) I, II	ATMO 469B Air Pollution II, (3) II (odd years)
	CHEE 400R Water Chemistry (3) I
<b>Select one (3-4 units)</b>	CHEE 400L Water Chemistry (1) I
SWES 470 Soil Physics (3) II	SWES 425 Environmental Microbiology (3) I
HWR 431 Hydrogeology (4) I	SWES 440 Biodegradation (3) II (even years)
	SWES 453 Remote Sensing of the Environment (3) I
<b>Select one (3 units)</b>	CHEE 478 (CE 478) Intro Hazardous Waste (3) I, II
HWR 423 Hydrology (3) I	CHEE 370R Env & Water Engineering (3), I, II
WSM 460 Watershed Hydrology (3) I	CHEE 370L Env & Water Engineering (1) I, II

Students must complete following prerequisites:

MATH 129 Calculus II (3) I, II

PHYS 103 Intro Physics II (3) I, II, Sum, or PHYS 241 Intro Electricity & Mag (4) I, II, Sum

## 11. Remote Sensing and Geospatial Analysis

This focal area applies principles of remote sensing and geographic information systems analysis tools and their applications to the study of the environment and global change

For further information contact:

Dr. Phil Guertin, 621-1723, [phil@nexus.snr.arizona.edu](mailto:phil@nexus.snr.arizona.edu)

(18 Units upper division)

<p><b>Required Courses (6 units)</b> RNR 417 Geog Info Sys Nat Resources (3) I SWES 330 Intro Remote Sensing (3) I</p>	<p><b>Options (6 units)</b> GEOG 303 Field Studies of Env Geography (3) I, II, SUM GEOG 357 Geog Research Methods (3) I, II GEOG 416A Computer Cartography (3) I GEOS 478 Global Change (3) I OPTI 531 Image Processing Lab (3) I OPTI 550 Fundamentals of Remote Sensing (3) II RNR 271 Nat Resource Computer Appl (3) II RNR 321 Nat Resource Measurements (3) II RNR 473 Spatial Analysis/Modeling (3) I SWES 431 Soil Genesis, Morph/Taxon (3) I SWES 461 Soil/Water Cons (3) PreSession (odd yrs) SWES 470 Soil Physics (3) II</p>
<p><b>Select two (6 units)</b> RNR 419 Carto Model for Nat Resources (3) II RNR 420 Advanced Geog Info Sys (3) II SWES 453 Remote Sensing Environment (3) I SWES 483 Geog Appl Remote Sensing (3) II SWES 490 Remote Sensing Planet Earth (3) II</p>	

## 12. Science and Policy Focus

This focus emphasizes environmental science policy issues. It includes courses in a variety of disciplines, from public policy to ecology. This focal area is ideally suited for Pre-Law students.

For further information contact:

Dr. Robert G. Varady, 884-4393, [rvarady@u.arizona.edu](mailto:rvarady@u.arizona.edu)

Dr. Edella Schlager, 621-5840, [eschlager@bpa.arizona.edu](mailto:eschlager@bpa.arizona.edu)

(18 units upper division)

<p><b>Required Courses (9 units)</b> AREC 476 Env Law/Econ (3) II SWES 444 Applied Environ Law (3) I PHIL 323 Env Ethics (3), I,II, SUM</p>	<p><b>Option (3 units)</b> ANTH 307 Ecol Anthro (3) II ANTH 424A Political Ecology (3) I AREC 375 Land/Water in the American West (3) II AREC 377 Econ of Env Resource Conserv (3) II AREC 464 Econ of Policy Analysis (3), I AREC 479 Econ of Water Management/Policy (3) II ATMO 336 Weather, Climate, and Society (3) I,II COMM 411 Comm/Conflict Management (3) I,II ECOL 406 R/L Conserv Biol (4) I ENGL 306 Advanced Composition (3) I,II GEOG 461 Env &amp; Resource Geography (3) II HIST 355 U.S. Env Hist (3) I,II HIST 356 Global Env Hist (3) I,II PA 406 Bureaucracy, Politics, &amp; Policy (3) I PA 461 Global Climate Change Policy (3) I,II PA 480 Formation of Public Policy (3) II PA 481 Env Policy (3) I PSYC 374 Env Psych (3) I RNR 480 Nat Resource Policy/Law (3) II RNR 485 Nat Resource /Econ &amp; Planning (4) I SOC 313 Collective Behavior/Social Movements (3) I, II MN E 422 Engineering Sustainable Development (3) I</p>
<p><b>Select one (3 units)</b> PA 481 Env Pol (3) I RNR 480 Nat Resource Policy/Law (3) II</p>	
<p><b>Select one (3 units)</b> HIST 355 U.S. Env History (3) II HIST 356 Global Env History (3) I,II</p>	

Students must complete following prerequisite:  
POL 201 American Nat Gov (3) I,II (Tier II INDV)

### 13. Soil Science Focus

This focus emphasizes the properties and uses of soils, their classification, management, and conservation as important natural resources. This focal area qualifies students to be soil scientists or soil conservationists in U.S. Government agencies (i.e. Natural Resources Conservation Service or Forest Service). **NOTE:** Students can become certified as a **Certified Professional Soil Scientist** with the Soil Science Society of America. The Council of Soil Science Examiners (CSSE) offers exams in October and March each year.

For further information contact:

Dr. Craig Rasmussen, 621-7223, [crasmuss@ag.arizona.edu](mailto:crasmuss@ag.arizona.edu)

Dr. Thomas Wilson, 621-9308, [twilson@ag.arizona.edu](mailto:twilson@ag.arizona.edu)

(18 units upper division)

<b>Required Courses (12 units)</b>	<b>Options (6 units)</b>
SWES 316 Soil Fertility/Plant Nutrition (3) II SWES 401 Mgt Arid /Salt Soils (3) II (even yrs) SWES 431 Soil Genesis, Morph/Taxon (3) I SWES 470 Soil Physics (3) II	GEOS 478 Global Change (3), I RNR 403 Appl Geog Info Sys (3), I RNR 417 GIS for Natural & Social Sci (3), I SWES 330 Intro to Remote Sensing (3), I SWES 453 Remote Sensing of the Env (3), I SWES 461 Soil/Water Cons (3) Pre-session/odd yrs GEOS 450 - Geomorphology (Fall 4 units) GEOS 453 - Glacial & Quaternary Geol (3) II SWES 456A - Watershed & Ecosys Function (3) II WSM 473 - Spatial Analysis & Modeling (3) I SWES 425 - Environmental Microbiology (3) I SWES 426 Env. Micro. Lab (2) I

### 14. Sustainable Land/Water Management

This focuses on landscape-level processes in environmental science. It investigates human-caused deforestation and desertification, ecological restoration; water, soil and air pollution, and global change.

For further information contact:

Dr. Edward P. Glenn, 626-2664, [eglenn@ag.arizona.edu](mailto:eglenn@ag.arizona.edu)

Dr. Allan D. Matthias, 621-7226, [matthias@ag.arizona.edu](mailto:matthias@ag.arizona.edu)

Dr. James J. Riley, 591-4019, [jjriley@ag.arizona.edu](mailto:jjriley@ag.arizona.edu)

(18 units upper division)

<b>Required course (3 units)</b>	<b>Options (6 units)</b>
SWES 444 Applied Environ Law (3) I	ECOL 406 R/L Conservation Biology (4) I GEOG 304 Water, Environ, & Society (3) I, II, Sum GEOG 397A Field Study in Geog (1) I, II, Sum GEOG 461 Env & Resource Geography (3) II GEOS 450 Geomorphology (4) I GEOS 478 Global Change (3) I RNR 403 Appl Geog Info Sys (3) I,II SWES 316 Soil Fertility/Plant Nutrition (3) II SWES 401 Mgt Arid Land/Salt Soils (3) II (even yrs) SWES 425 Env Microbiol (3) I SWES 426 Env Microbiol Lab (2) I SWES 431 Soil Genesis, Morph & Taxon (3) I SWES 453 Remote Sensing of the Environ (3) I SWES 454 Water Harvesting (3) II SWES 456A Watersheds & Ecosys Function (3) II SWES 470 Soil Physics (3) II SWES 474 Aquatic Plants & the Environment (4) I SWES 475 Fresh Water & Marine Algae (4) II
<b>Select one (3 units)</b> RNR 403 Appl Geog Info Sys (3) I,II SWES 453 Remote Sensing of the Environ (3) I	
<b>Select one (3 units)</b> SWES 454 Water Harvesting (3) II SWES 461 Soil/Water Cons (3) Pre (odd yrs) WSM 460 Watershed Hydrology (3) I	
<b>Select one (3 units)</b> SWES 401 Mgt Arid Salt Soils (3) II (even yrs) SWES 431 Soil Gen, Morph & Taxon (3) I	



## 15. Water Resource Management

This focal area concentrates on water management and water-related courses to understand water quantity and quality issues associated with land use and climate change. This will prepare the student for careers in water policy and management.

For further information contact:

Dr. Tom Meixner, tmeixner@hwr.arizona.edu

Dr. D. Phillip Guertin, dguertin@cals.arizona.edu

(18 Units upper division)

<p><b>Required Courses (6 units)</b>          HWRS 423 Hydrology (3) II          HWRS 431 Hydrogeology (3) II</p>	<p><b>Options (continued)</b>          HWRS 443 Env Risk &amp; Eco Analysis (3) I          HWRS 449 Statistical Hydrology (3) II          HWRS 480 Isotope tracers in hydrogeo (3)I          PA 481 Env. Policy (3) II          RNR 403 Appls of GIS (3) I, II          RNR 417 GIS for Nat &amp; Soc. Sci. (3) I          SWES 444 Applied Environmental Law (3) I          SWES 454 Water Harvesting (3) II          SWES 461 Soil and Water Cons (3) Pre-session/odd yrs          SWES 471 Stream Ecology (3)          WFSC 441 Limnology (4) I          WSM 426 Watershed Engineering (3) 1          WSM 452 Dryland Ecohydrology (3) I          WSM 467 Advanced Watershed Hydro (3) II</p>
<p><b>Select Two (6 units)</b>          SWES 470 Soil Physics (3) II          HWRS 413A Field Hydrology (3) II          WS M 468 Wildland Water Quality (3) II</p>	
<p><b>Options (6 units)</b>          AREC 476 Env Law &amp; Econ (3) II          CE 427 Comp. Appl. In Hydraulics (3) I          GEOS 478 Global Change (3) I          HWRS 482 Appl. Groundwater Modeling (3) I          HWRS 415 Intro Water Res. Policy (3) II</p>	

Students must complete following prerequisites:

CE 214 Statics (3) I, II, Summer

CE 218 Mechanics of Fluids (3) I, II

MATH 129 Calculus (3) I, II, Summer