UNIT REVIEW FOR CY 2014

Unit Name: Soil, Water and Environmental Science

Unit Head: Jon Chorover

Date of review: March 12, 2015
No change in SWES budget, same funding previously supporting ERL now to support WEST.

Seems that Center designation is not as big a problem as previously thought, which is win-win, right?

Any current concerns that we should discuss?
A. Unit finance and business (10 min presentation + 10 min discussion)

1. Business personnel assessments

Reorganized business office support staff in 2014 (informed by conversations with Ratje)
- Removed 1.0 FTE in secretarial support and replaced with administrative associate focused on Human Resources. No net change in budget.
- Current front and business office includes Bus Mgr (Mills), Accountant (Zetterberg), Human Resources (Hefferan), and Admin Assoc (Haley). Total turnover in staff since Silvertooth days.
- In my view, all are doing an excellent job. But concerns about budget cuts and what that would do to what is finally smooth, efficient and effective departmental function. Any particular suggestions on how best to weather the coming storm? I’m mystified.

Reorganized spatial relation between dept. office staff: moved business office to main office
- SWES business office was previously across the breezeway from the departmental office, which limited ease of communication between business manager and department head.
- Moved business office into front office (bus mgr, accountant, human resources) and placed academic advisor (Landeen) in the student-friendly hallways of Shantz. This reshuffling seems to be working (though it’s probably just cognitive dissonance and we just like to move furniture).
- Staff cross-training for adequate backup, working to improve functionality of department policies/procedures, identified and remedied financial, procedure, or operational inefficiencies.

2. Finance and budget – focus on overview of strengths and weaknesses of the unit financially

On the one hand we got us some strengths:
- No debts/payback
- Traditionally conscientious spenders, maintain a positive budget balance
- 41% SWES revenue PI controlled – SWES is an entrepreneurial department (e.g., Pepper, Maier, Gerba, Chorover)

On the other, we got some concerns:
IDC is not regenerating, sustaining Business Office and Admin staff salaries post recession cuts has proven a challenge
We’ll be hammered by upcoming cuts of the 7.6% magnitude. Then plan for another hit next year. WTF?

Where to cut?
A. Unit finance and business *cont’d* (10 min presentation + 10 min discussion)

3. **New resource generation – specific opportunities we are exploring**
   - SWES will apply for an undergraduate program fee to defray the expense of laboratory and field courses
   - Pursuing increased SCH and majors - *Recruitment Committee*
   - Increasing research revenue and expenditures
   - Omani collaboration on laboratory development led by SWES
   - Relationship with Howard Buffet’s farm group in Patagonia

4. **How are business functions in your unit helping achieve the goal of being “the most effective, efficient, responsive, flexible, and financially sustainable college on campus”?**

   *Moved business office to main office with dept. head and restructured personnel*
   - More information sharing and collaboration among staff
   - Increased communication between head and business manager
   - Tighter integration of business office into department
   - Business Manager (Christie Mills) is active with CALS Business Services
     - volunteering to test dashboards and reports
     - openly offering feedback and input
     - sitting on boards
     - engaged in what’s happening and changing in CALS business
   - highly valued member of SWES
B. Cooperative Extension (10 min presentation + 10 min discussion)
Total Extension FTE annually for the last 3 years (3 numbers):

FY12 – 3.52    FY13 – 3.14    FY14 – 4.14

Unit’s Extension outcomes and impact for stakeholders by individual program, in terms of economic impact (e.g. dollars and jobs), by individual program:

Some exemplary replies are that (Word file for full text):
- Soil erosion prevention: Assuming $3 per ton of soil for nutrients, $2 per ton for water loss, and $3 per ton for off-site impacts, prevention of this soil loss saves Arizonans in impacted watersheds more than $70 per person per year or $3.9 M per year.
- Salinity prevention: Total damages from salinity in the Colorado River range from $310 million to $831 million annually, based on the 1976-85 average levels of river salinity. This project seeks to decrease damages to agriculture ($113-$122 million), households ($156- $638 million), utilities ($32 million), and industry ($6- $15 million).
- Food safety: Assuming the cost of spinach at $39.90/CWT and 155 CWT/acre and 10% of un-harvested spinach are brought back into harvest due to water quality related contamination improvements, then annual benefits from water pollution control are estimated at $618,450/year.
- Health certifications: Through striped bass exports to CA, AZ gains $1.2M/yr and two new full time jobs to accomplish the inspections.
- Diminishing waterborne disease: This project seeks to decrease related medical costs and lost wages that account for a yearly loss of up to $17 billion nationwide. In Arizona, the main bacterial causes of water-related illness are Salmonella, Campylobacter, Shigella, and Escherichia coli O157:H7. It is estimated that $40 per capita in annual damages accrue from microbiological non-point source pollutants.
- Mitigation of drought losses: Data translation associated with this program are used in determining USDA federal drought disaster aid to Arizona.
- STEM pipeline for environmental science: Long term returns from tribal college students graduating with university STEM degrees in mining engineering or environmental science. Tribal student employment with tribal, industry and government will contribute to a positive economy. Although tribes are 1% of the U.S. population, they control 10% of the U.S. energy reserves and contribute billions of dollars to the national energy economy.
Describe the level of program integration (e.g. with county Extension programs, center programs, and stakeholders) of Extension programs in your unit:

SWES has Extension programs in:

- Water Quality and Supply (Artiola, Chief, Rock)
- Climate Science and Management (Crimmins)
- Arizona Biometeorology and Water Management (Brown)
- Soil Fertility (Sanchez, Walworth)
- Aquatic Biology (Fitzsimmons)
- Agricultural Food Safety (Kahn-Rivadeneira, Sanchez)
- Environmental Risk Assessment and Management (pending)

As a whole, these programs are stakeholder-oriented, Arizona-focused, and highly-integrated with county Extension programs and center programs (Sanchez and Rock and MAC, Kahn-Rivadeneira at YAC).

Describe the level of integration between the research and Extension components of faculty programs in your unit:

SWES programs strongly integrate R and E. An effective program integrates a strong original and collaborative research component to feed into and firmly ground the Extension program with hard scientific data, and attract the best and brightest (JCS).

Loss of the research component from a CE/R appointment gives a scientist glass knees.
Unit’s Extension **social outcomes and impact** by individual program:

*Summary statements here, for full details see Word file:*

**Artiola:** Well owner education on issues, maintenance and treatment options for well water quality. Health-related benefits of reduced toxic exposures.

**Brown:** Demand for AZMET is high as indicated by user sessions and downloads. Independent (managers), ag. producers, and also NGOs, state and national agencies. $132,000/yr in contributions.

**Chief:** Educating stakeholders about climate change and minimizing mining impacts on water and air resources. Support management decisions to minimize impact and loss.

**Crimmins:** Citizen science (Rainlog) high profile, cited often in AZ press. Provision of climate science and drought monitoring mitigation data for public, managers, and agencies.

**Fitzsimmons:** Production of aquaculture products and consumption of fish have both increased in AZ in last year. Public attitudes toward AC improved through info dissemination.

**Jacobs:** CCASS (initiated 1/1/14) dedicated to climate adaptation science and solutions.

**Kahn-Rivadeneira:** Close interaction with growers in Yuma leading to new ways to manage food safety impacts of animal intrusions to agricultural fields and associated pathogen intro.

**Rock:** Extending BMPs to enhance produce safety and linkages to water quality.

**Sanchez:** Efficient fertilization and irrigation for vegetables (economic and environ. benefits)

**Walworth:** Soil fertility and management for Arizona soils targeting producers / managers.
List company, corporation or industry interactions with Cooperative Extension in your unit this past year including advisory boards, individual faculty/industry research projects, and classroom or curricular participation.

Extracted from UAVitae 2014

AZ Department of Environmental Quality
NOAA
USDA
National Weather Service
USDA/APHIS
Tucson Water
Pima County Wastewater
Bureau of Reclamation
Lower Colorado River Accounting System
Tohono O'odham Community College
Dine College
Environmental Protection Agency
Freeport McMoran Copper & Gold
USGS Science Climate Center
Arizona Geologic Survey
Salt River Project
Arizona Republic
Arizona Daily Star
Climate Assessment for the Southwest (CLIMAS)
FEMA
Water Research Foundation
Arizona and Western Pecan Growers Associations

Curricular Development 2014

K-16 program development on water quality, crop production, climate change, and environmental reclamation
C. Research. Units fill in bold only, CALS central Admin will provide you with the other data. (slides 5-8; 15 min presentation + 15 min discussion)

1. Total State-Funded Research FTE annually for the last 5 years (5 numbers):
   FY12 - 17.22; FY13 - 15.41; FY14 - 18.01; FY15 - 16.4

2. Unit Research Expenditures CY14: $2,203,627

3. Unit's share of CALS research input (research FTE, start-up and any other investment) for the last 5 years (5 percentages):
   FY10 - 7.23%; FY11 - 8.31%; FY12 - 8.68%; FY13 - 7.43%; FY14 - 10.36%

4. Number of extramural proposals submitted by the unit divided by faculty FTE annually for the last 5 years (5 numbers):
   FY10 – 5.74; FY11 – 6.48; FY12 – 5.19; FY13 – 6.10; FY14 – 7.12

5. Number of peer-reviewed publications divided by faculty FTE annually for the last 5 years (5 numbers):
   FY10 – 6.27; FY11 – 8.56; FY12 - 8.04; FY13 - 10.82; FY14 - 10.69

6. List of successful proposals, sponsors, direct funding amount, total amount and match amount on separate Excel spread sheet for CY14.
H-index relations for SWES

h of his/her \( N_p \) papers have at least \( h \) citations each, and the other \( (N_p - h) \) papers have no more than \( h \) citations each.

In other words, a scholar with an index of \( h \) has published \( h \) papers each of which has been cited in other papers at least \( h \) times.

Reflects both the number of publications and the number of citations per publication.
Intellectual property data for FY14

Disclosures: – Synthesis of Glycolipid

Provisional Patents: *Synthetic Nitration of Aromatic Compounds*

Patents: none new for 2014

Licenses: none new for 2014

Companies spun out: There is one spinning out of glycolipid project.
D. Academic Programs (slides 9-13; 15 min presentation + 15 min discussion)

1. **Describe** all anticipated changes, deletions or additions in your **majors, minors** and/or **certificates**.
   - Grad College approval for an AMP SWES MS with corresponding degrees from ENVSBSES and SPSBS
   - Requested EVNSBSES be added as a corresponding degree to the AMP ATMO MS.
   - Working toward development of a fully on-line ENVSBSES degree.
   - Working to have Curricular Affairs correct the omission of SWS undergraduate minor from the catalog.
   - Developing Graduate Certificate in Environmental Risk Assessment and Management (ERAM)

2. **List** current distance certificate programs, study abroad, executive and continuingeducation. • ENVS 495F/595F Conservation Biology: Field Studies in Nambia – summer course
   • ENVS 495G/595G Amazon Rain Forest Conservation Biology in Ecuador – winter course
   • ENVS 4XX/5XX Environmental Conservation in Australia (6 units) – proposed fall 2014
   • SWES active encouragement that student pursue Soil Science Certification with SSSA

3. **List** new courses planned and/or course changes or closures for courses offered in **winter or summer sessions**.
   • ENVS 454/554 Water Harvesting offered (summer)
   • ENVS 461-561 Soil and Water Conservation offered (summer)
   • ENVS 495F/595F Conservation Biology: Field Studies in Developing Countries offered (summer)
4. **Describe** any anticipated changes in instruction faculty that will either streamline your operation or disrupt your course instruction.

- Relocation
- Sabbatical

5. **Describe** your most compelling academic program need

**Assistant Professor of Microbial Biogeochemistry (70% R / 30% T)**

- Environmental microbiology/subsurface science historically strong SWES foci
- Aging demographic
- Lacking soil fertility expertise (connection to production agriculture, USDA)
- Big funding in carbon cycle research (NSF, DoE)
- Opportunities with ecosystem genomics institute
- Pending Science and Technology (STC) Center preproposal
6. **Complete** the attached course grid

7. **Describe** your marketing/recruitment plans to increase the following ABOR metrics:

**Number of Bachelor's Degrees Awarded**
- Creation of a SWES Recruitment Committee including mission statement; target audience ID; tactics; new opportunities; careers held by alumni, past student internships
- Assessment of recruiting materials
- Initiate creation of new brochures for the academic programs and revamping Curriculum Guide with updated branding
- Attend Recruitment Events at Community Colleges and other events including:
  - Arizona Experience in association with the SPLS
  - BIO5/BIOSA; CALS UA Clicks; SARCEF; SW AG Summit; CALS Burrito Breakfast Social Media (fb);
- Development stage of an on-line degree program
- Proposal to have five minute Faculty profile videos on website; ENVS 195A, and 200
- Exploring first year ENVS parallel with new B.S. Environmental Engineering

**Undergraduate Enrollment (Official 21st Day)**
- Creation of on-line courses for the on-line BS in ENVS.
- Creation of Env Engr degree will increase demand for ENVS 424R/L; 430R/L; 444, 462; 464 and 479
- Diminishing substitution of non-ENVS courses for requirements of B.S. ENVS degree

**Number of Graduate Degrees**
Graduate students are actively recruited at professional conferences and at international and national meetings (i.e., SSSA and AGU)
We currently receive many more applications from qualified applicants than can be admitted with funding.
8. **Number of undergraduate students in the unit involved in**

i. Research experiences  43

ii. Extension experiences  11

iii. Internships  11

iv. Experiential learning  13
9. List the top 5 employers of your graduates:

Private industry (environmental consulting firms, agricultural industry)
Institutions of Higher Learning – postdocs, research scientists, faculty, instructors, lab managers
Federal Agencies (USEPA, NRCS, USDA, USDI, DoE, BLM)
State Agencies (e.g., ADEQ)
City Governments
Non-profit organizations (Nature Conservancy, Arizona PIRG, Tucson Green and Beautiful)

10. Describe company, corporation or industry interactions with your unit this past year.


Individual faculty/industry research projects: Rainbird, Freeport McMoran, TIA, Motorola Superfund Site, Clorox, Kimberly Clark, Golder Associates, ASARCO-Grupo Mexico, Salt River Materials Group, Resolution Copper
E. List faculty awards/recognitions (1 min presentation + 1 min discussion):

Distinguished Service Award, U. S. Food and Drug Administration Committee on Food Safety, 2014-06-30 Summer 2014 – Gerba

Distinguished Fellow, 2014, Morrison Institute for Public Policy, Arizona State University, Morrison Institute for Public Policy, Arizona State University, 2014-11-14 Fall 2014 – Megdal

12 Torches Ceremony Honoree for my water work in Israel and the Palestinian Territories, Weintraub Israel Center of the Jewish Federation of Southern Arizona, 2014-05-14 Spring 2014 – Megdal

Safety Culture Research Laboratory, McLain laboratory selected by University of Arizona Risk Management Services as demonstration “safety culture research laboratory” for Tri-University Lab Safety Demonstration, 2014-10-03 Fall 2014 – McLain

2014 Outstanding Associate Editor, Agronomy Journal, 2014-11-11 Fall 2014 – McLain


Recognition by the Soil Science Society of America (SSSA) for Dedication and Service as the 2014 Soil Physics Division Chair, Soil Science Society of America, 2014-11-05 Fall 2014 – Tuller

Five Star Faculty Finalist, Honors College, 2014-04-30 Spring 2014 – Wilson

Public Voices Fellowship, The OpEd Project Fall 2014 – Maier

Catapult Award for Excellence in Commercialization Partnering, Tech Launch Arizona, 2014-03-27 Spring 2014 – Maier
F. Alumni and Development history and plan for CY15 (10 min presentation + 10 min discussion):

- Met with Jim Davis and Anne Stevens to discuss pursuit of potential donors. Their assessment was that SWES does not have clear targets beyond small donations. I am not inclined to spend my time searching for $100 donations here and there. It is more fruitful for me to spend my time on bringing in IDC on research proposals.

- Based on my own searching, I proposed a potential partner for SWES and SPLS, to start a relationship. Shared information with Jim Davis, Ann Stevens, met with Mindy Means. I heard they would be in touch with me, but haven’t heard back. (Karen Schumaker indicated interest in collaborating on this.)

- Placing a major development effort on a UA-Omani Royalty I partnership on the design, construction, management and operation of a Central Date Palm Laboratory in Oman.

  - Builds on an analytical chemistry laboratory proposal I submitted to Omanis in response to a request from UA Global Initiatives.
  - Requested by Omanis to expand on proposal so that the newly constructed building would house seven laboratories.
  - Five year consulting and hiring arrangement with SWES as lead
  - Will bring IDC and administrative support funding to SWES and UA GI