2004
Program Proceedings

Research Center
Administrators Society

February 1-3, 2004

Phoenix, Arizona

The 2004 Winter Program Proceedings
of the
Research Center Administrators Society
Phoenix, Arizona
February 1-3, 2004

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UNIVERSITY OF ARIZONA AGRICULTURE PROGRAM

COLIN KALTENBACH, DIRECTOR
AGRICULTURAL EXPERIMENT STATION
UNIVERSITY OF ARIZONA

ARIZONA AGRICULTURAL EXPERIMENT STATION

Arizona Agricultural Experiment Station

13 Academic Units
11 Outlying Centers at 9 Locations
28 Fields of Science (Physiology, Biochemistry, Entomology, etc)
>60 Areas of Investigation(Soil, Water, Plants, Livestock, etc)
>200 Specific Research Projects
Fundamental Discovery to Application

Academic Units

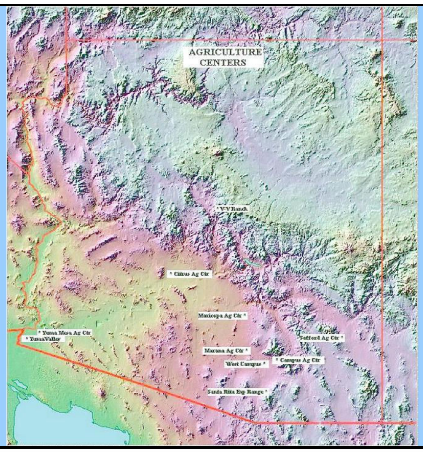
Agricultural and Biosystems Engineering
Agricultural Education
Agricultural and Resource Economics
Animal Sciences
Entomology
Nutritional Sciences
Office of Arid Lands Studies
Plant Sciences/Plant Pathology
School of Family and Consumer Sciences
School of Renewable Natural Resources
Soil, Water, and Environmental Sciences
Veterinary Science and Microbiology

Administrative Units

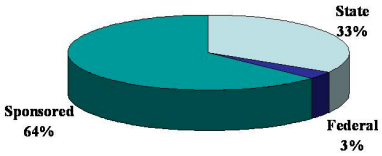
Academic Programs Office
Alumni Office
Arizona Agricultural Experiment Station
Boyce Thompson Arboretum
CALS Administrative Services
CALS International Programs
Cooperative Extension
Development and Alumni Office
Educational Communications and Technologies Office
4--H Office
Pesticide Information and Training Office
Water Resources Research Center

Agricultural Centers

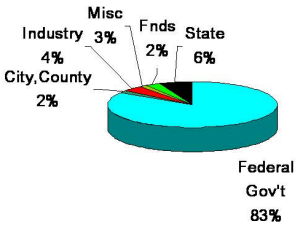
Campus Agricultural Center
Citrus Agricultural Center
Marana Agricultural Center
Maricopa Agricultural Center
Safford Agricultural Center
Santa Rita Experimental Range
V Bar B Ranch
West Campus Agricultural Center
Yuma Agricultural Centers (Valley & Mesa)



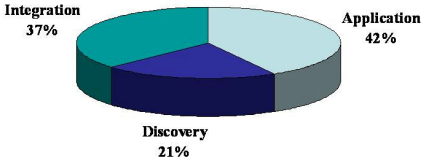
AZ Agricultural Experiment Station Total Funding ($62.7 M) FY 02-03



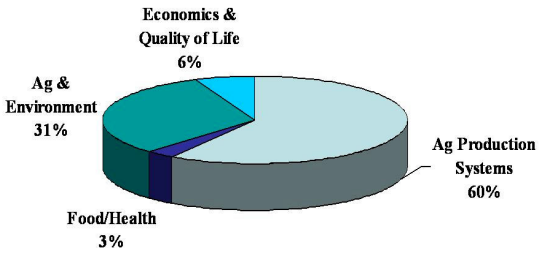
AZ Agricultural Experiment Station Sponsored Sources($39.7 M) FY 02-03



AZ Agricultural Experiment Station Expenditure by Field of Science

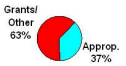


Research Expenditures by GPRA Goals FY 2001



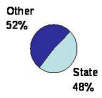
Arizona Agricultural Experiment Station FY 03 Expenditures

Total Station



$ 61.6 million

Ag Centers

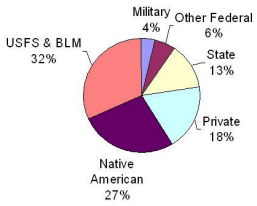


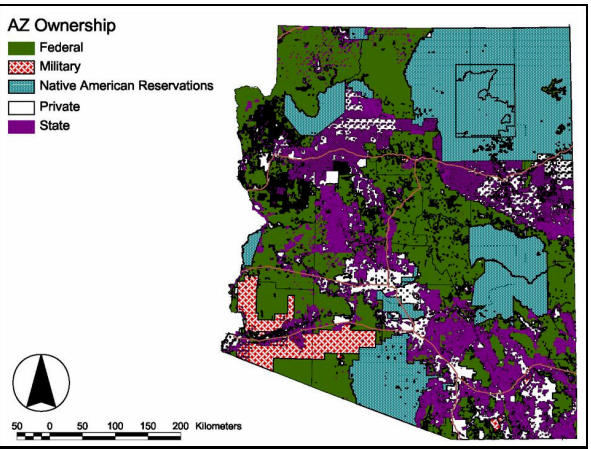
$ 7.5 million

"Other" Sources

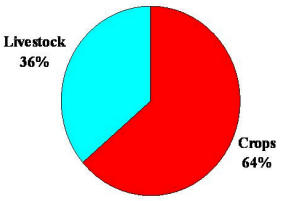
- Farm Service Agreements
- Facility Use Agreements
- Commodity Sales
- Land Rental
- Miscelleneous

LAND OWNERSHIP ARIZONA

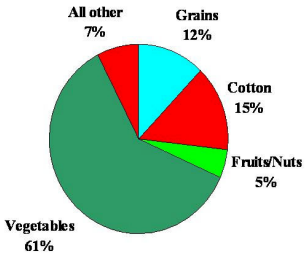




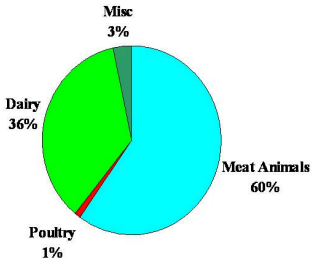
Cash Receipts All Commodities



Value Crop Production



Value Animal Production

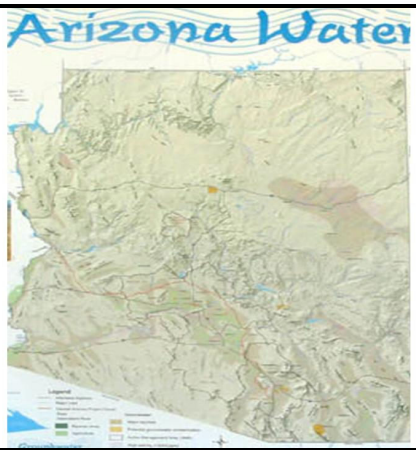


Major Issues in AZ Agriculture

- Water
- Water
- Water
- Water

Major Water Issues

- Water Quantity
- Water Quality
- Water Use & Re-use
- Water Ownership
- Water Availability



Impact of budget reductions on the future mission of research and extension centers

Impacts

- Reduced faculty

Impacts

- Reduced faculty
- Reduced staff

Impacts

- Reduced faculty
- Reduced staff
- Reduced flexibility

Impacts

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- Adaptation to a new funding model

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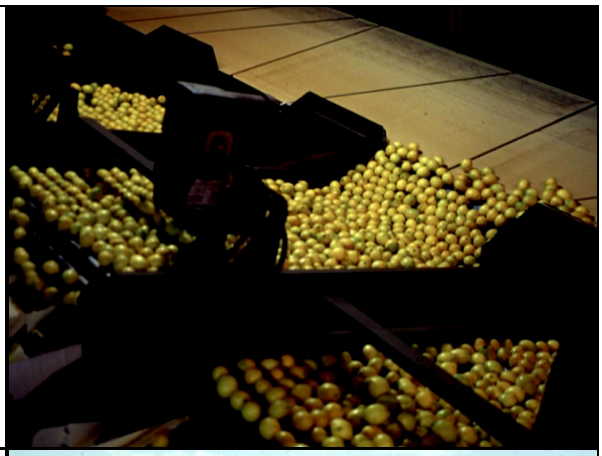

Impacts

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- More pressure on Center Directors & Administrators

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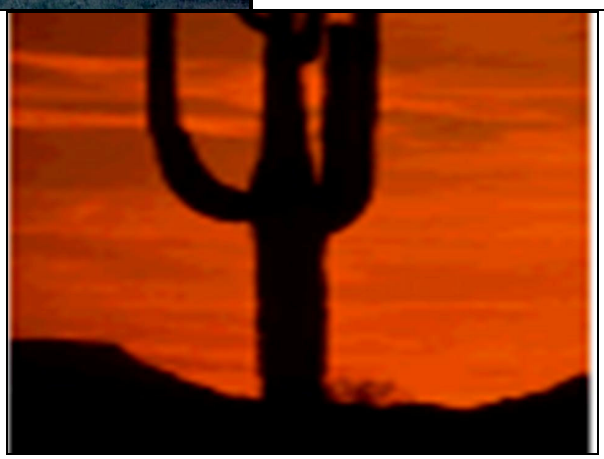
Bottom Line

- No problems that cannot be fixed with more time and money !!



LET'S GO SEE OL' MCDONALD'S FARM

MARTHA GLASS, MANAGER
AGRITOURISM OFFICE
NORTH CAROLINA DEPARTMENT OF AGRICULTURE & CONSUMER AFFAIRS

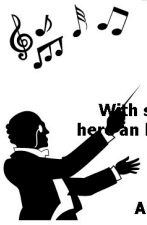
Cultivate Your Roots!

Presenter:
Martha Glass, Manager
Agritourism Office

NC Department of Agriculture & Consumer Services
Britt Cobb
Commissioner

www. ncagritourism.com

Ol' MacDonald's Song



Old Man Hatch he had a plan
e-i-e-i-o
To test our crops in dirt and sand
e-i-e-i-o
With some veggies here, and fruits right there,
here an herb, here a spice, everywhere it looks nice!
Old Man Hatch he hatched a plan
e-i-e-i-o

And on our farms we grew some grain
e-i-e-i-o
We tested it in drought and rain
e-i-e-i-o
With a wheat plot here, an oat plot there, here's some spelt,
try some rye, everything we want to try,
Old Man Hatch -- we like his plan!
e-i-e-i-o

Let's Go See Ol' MacDonald!

Agritourism -
"A value-added farming activity which provides recreational, educational or other activities or services for which the public pays admission to participate in and/or purchase an agricultural product or experience"

...and take home a memory!

Ag•ri•tour•ism- (ag'ri toor'iz'm)

An activity in which people of all ages can go to a farm, have a lot of fun and learn about how food gets to the table, and help the farmers earn more money.

Our Research Stations Promote Agritourism

- "Stations" at the Stations
- No more petting or feeding
- Invitations to K-12
- TV remotes for Noon News
- "Thank You" on the Evening News

Our Research Stations Promote Agritourism

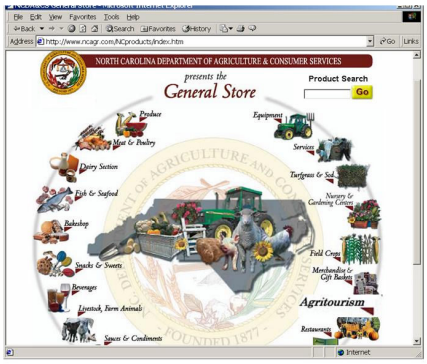
Here's what we want to do -

Find farmers who are in danger of losing their farms due to decreasing incomes, and help them explore the options available in becoming an agritourism farm.

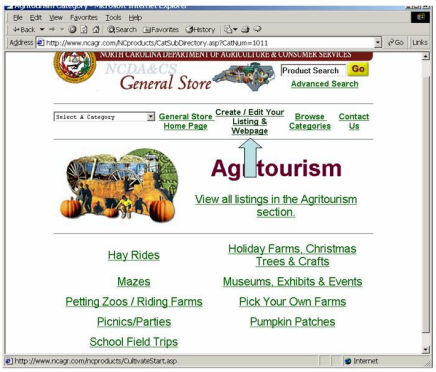
Farmers Making $$$

NCDA&CS will Market you -FREE!

NCDA&CS will Market you -FREE!



NCDA&CS will Market you -FREE!



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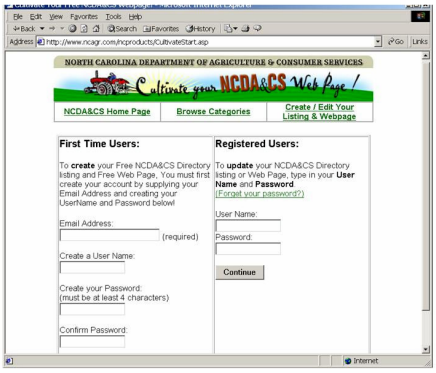

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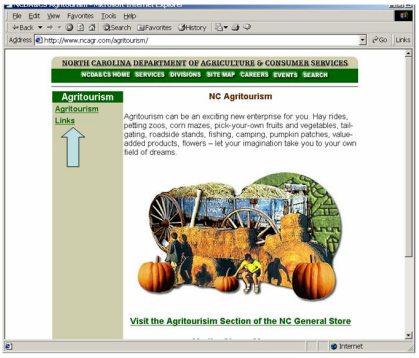
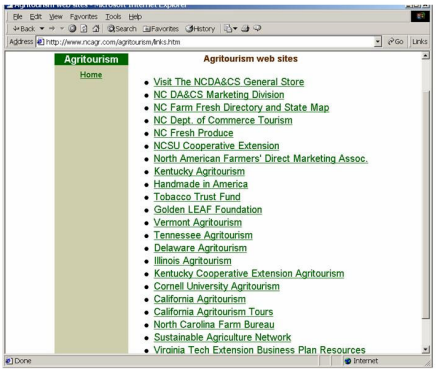
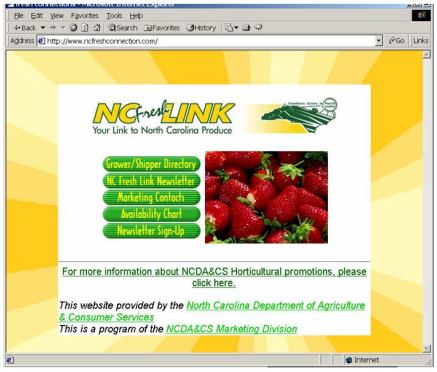


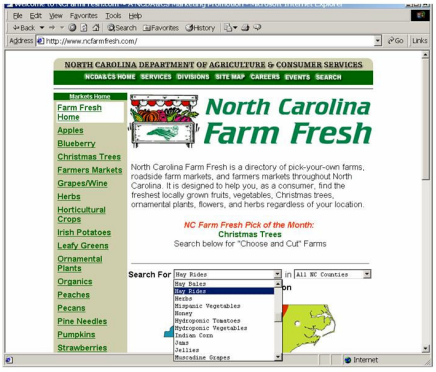
Agritourism Links



Agritourism Links



Agritourism Links



Media Friendships

Support for the Farmers

- Cooperate & Coordinate with Extension Service
- Meet County Extension Agents
- Follow up with leads

NC STATE UNIVERSITY A&T STATE UNIVERSITY COOPERATIVE EXTENSION
Helping People Put Knowledge to Work

Promote the Agritourism Idea!

- Talk to Civic Groups
- Watch Local Papers
- Talk to Newspaper Friends
- Work with Other State Agencies

Know the Challenges

- Signage
- Insurance
- Risk Assessment
- Customer Service

Support, Support, Support!

- Mentor
- Network
  - North American Farmers Direct Marketing Association
- Advise
  - Know your resources
- Be Available

Goodness Grows In NC

Questions?

Questions?

Email: ncagritourism@ncmail.net
Phone: 919.733.7887

http://www.ncagr.com/agritourism/

ARIZONA WATER ISSUES

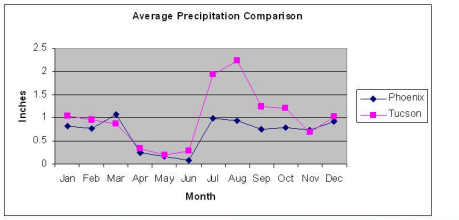
SHARON MEGDAL, ASSOCIATE DIRECTOR
WATER RESOURCES RESEARCH CENTER
DEPARTMENT OF AGRICULTURE & RESOURCE ECONOMICS
UNIVERSITY OF ARIZONA

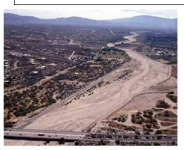
Securing Sustainable Water Supplies in Arizona

2004 RCAS Winter Meeting
February 2, 2004
Sharon B. Megdal, Ph.D.
Associate Director, Water Resources
Research Center
University of Arizona
350 N. Campbell
Tucson, AZ 85721
520-792-9591, ext 21
fax 520-792-8518

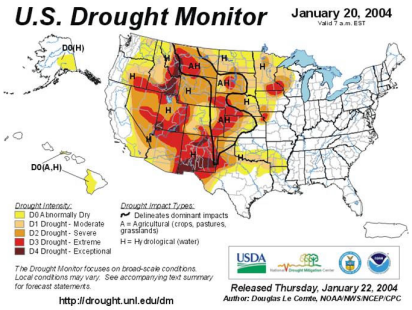
email smegdal@ag.arizona.edu

Arizona is an arid state

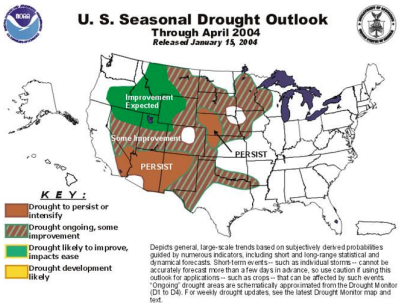




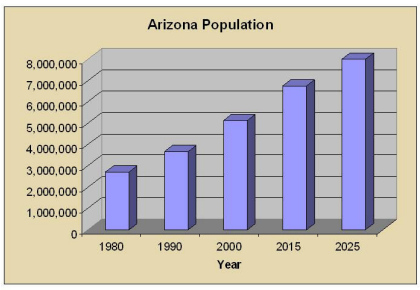
Arizona is experiencing drought conditions…



That are expected to last for some time…

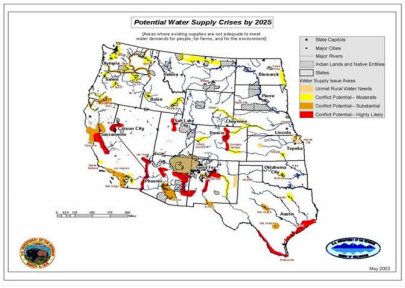


Arizona is rapidly growing, with a large proportion of the population relying on groundwater

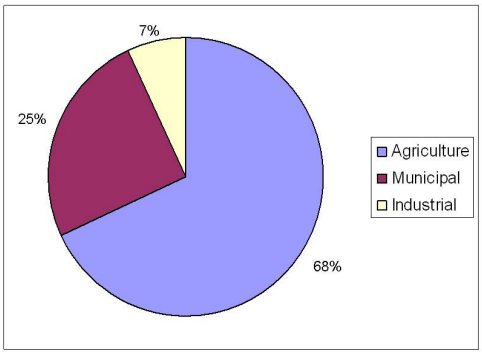


Water 2025

"Crisis management is not an effective solution for addressing long-term, systematic water supply problems." Interior Secretary Gale Norton



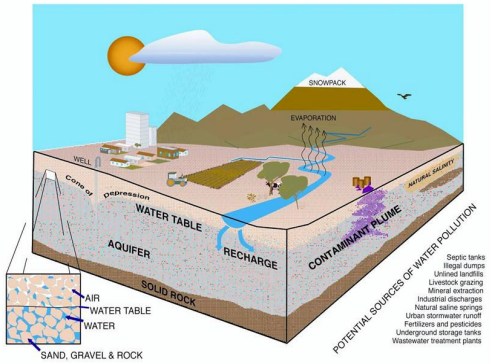
Uses of Water



Sources of Water - 1998

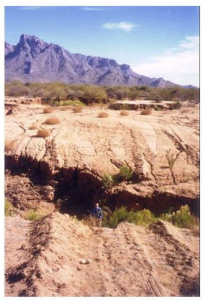
Water Sources	Acre Feet	Percent of Total
Surface Water		
Colorado River	1,398,000	20%
CAP	1,025,000	15%
In-State Rivers	1,427,000	21%
Groundwater	2,922,000	41%
Reclaimed Water	178,000	3%
Total	6,950,000	100%

One acre foot is 325,851 gallons of water. An acre foot of water is the amount that covers one acre of land with one foot deep water.



Overdraft a Problem

- GW pumped by municipal water providers, mining, agriculture and other industry.
- Groundwater pumped from aquifers faster than it is replenished by nature
- Problem: declining water tables



The Groundwater Management Act (GMA) of 1980

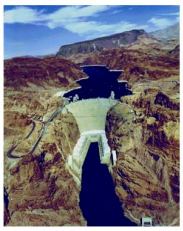
- Established areas where groundwater management was required – **Active Management Areas**, each with a statutory management goal. Safe yield is the goal in most AMAs.
- GMA required the adoption of **Assured Water Supply Rules**, which require growth to depend on renewable supplies.
- **Conservation** programs for each water using sector and management plans are developed by the Arizona Department of Water Resources every 10 years.

Innovative Approach to Groundwater Management in certain parts of the state

AMAs and INAs

Importance of Renewable Supplies

- Central Arizona Project
- Salt River Project



Hoover Dam

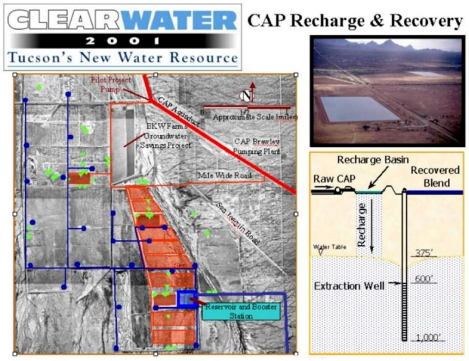
Roosevelt Dam

Effluent or Reclaimed Water Use

Policy Innovations

- Water some times not where it is needed spatially or in time
- Solution: **Storage and Recovery**
  - Underground Storage and Groundwater Savings
  - Central Arizona Groundwater Replenishment District
  - Intrastate and interstate water banking

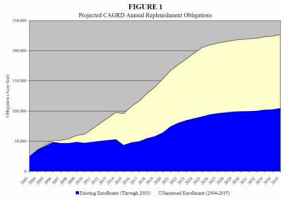
Underground Storage



Groundwater Savings Projects

Central Arizona Groundwater Replenishment District

- An important tool to assist in meeting assured water supply requirements



From 12/2003 CAGRD Conceptual Plan

Examples of Areas of Research

- The implications of long-term storage of surface water or effluent
- Use of effluent for potable water needs – the next major new water source
- Recovery of stored water (intra and inter state)
- Water Transfers and Water Marketing
- Drought issues
- What to do in the non-AMA areas

What to do in the non-AMA areas of the state?

Arizona Watershed Alliance member watershed groups

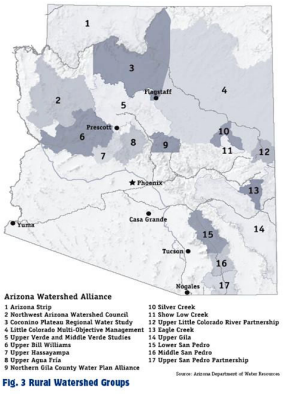


Fig. 3 Rural Watershed Groups

Examples of Areas of Research (cont.)

- What to do in the non-AMA areas
  - Data
  - Regulatory (water adequacy requirements)
  - Financial
  - Where does the water come from?
- Who does what?
  - Private versus public
  - Local versus state level

WRRC Activities

- *Arizona Water Resource* Newsletter
- Future of Agricultural Water Use in Arizona Conference, April 28, 2004 in Casa Grande, Arizona
- Involvement in UA Water Sustainability Program
- Project WET
- Many research, education and outreach activities

Concluding Remarks

- When the well's dry, we know the worth of water. – *Benjamin Franklin, Poor Richard's Almanac, 1746*

•The frog does not drink up the pond in which he lives. – *American Indian Proverb*

NATURAL RESOURCE MANAGEMENT ISSUES - THE NATURE CONSERVANCY PERSPECTIVE

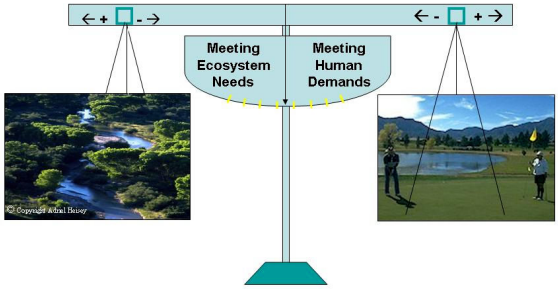
HOLLY RICHTER
THE NATURE CONSERVANCY

Upper SanPedro Partnership

Linking Science and Policy

The Nature Conservancy

The Challenge: Finding the Balance

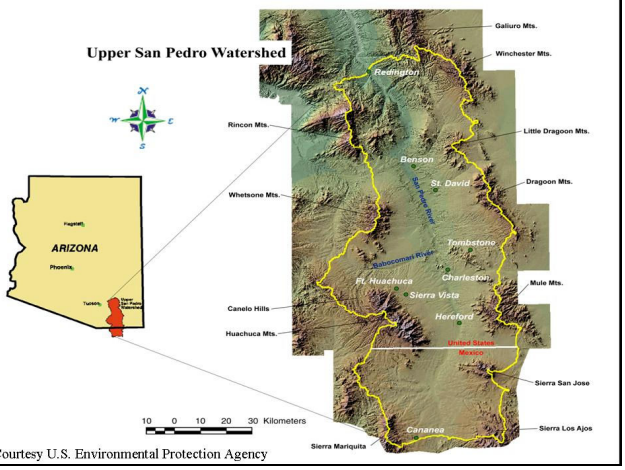


Upper San Pedro Partnership

- A consortium of 20 agencies and organizations that cooperate in the identification, prioritization, and implementation of comprehensive policies and projects to assist in meeting the water needs of the Sierra Vista Sub-watershed of the San Pedro River.

Upper San Pedro Partnership

City of Bisbee
City of Sierra Vista
City of Tombstone
Huachuca City
Hereford NRCD
Bella Vista anches/Water
Bureau of Land Management (BLM)
U.S. Geological Survey
Audubon Arizona
Arizona State Land Department
U.S.D.A. Agricultural Research Service
National Park Service
U.S. Forest Service
The Nature Conservancy
Arizona Department of Water Resources
Arizona Department of Environmental Quality
Association of Conservation Districts
U.S. Fish and Wildlife Service
Cochise County
U.S. Army/ Ft. Huachuca

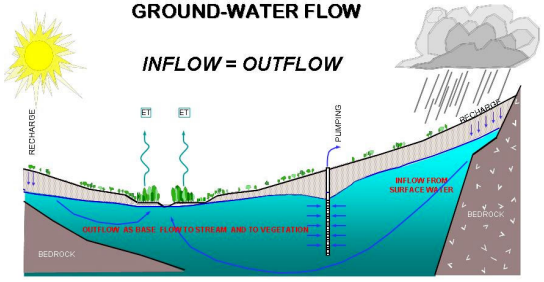


Courtesy U.S. Environmental Protection Agency

SIMPLE MODEL OF

GROUND-WATER FLOW

INFLOW = OUTFLOW



USGS

What We Do

- Sponsor research needed for sound decision making.
- Recommend effective conservation actions.
- Support our members' conservation efforts.

Member Projects

✓ Effluent recharge projects:
Huachuca City, Sierra Vista, Bisbee, Fort Huachuca

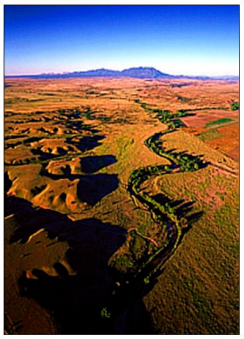
✓ Site Development Standards:
Cochise County, Sierra Vista

✓ Conservation easements:
BLM, The Nature Conservancy, Fort Huachuca

✓ Water Wise:
Bella Vista Ranches, Cochise County, Sierra Vista, Fort Huachuca

Current Partnership Research and Monitoring Projects

- Providing the information necessary for sound decision-making



USDA ARS

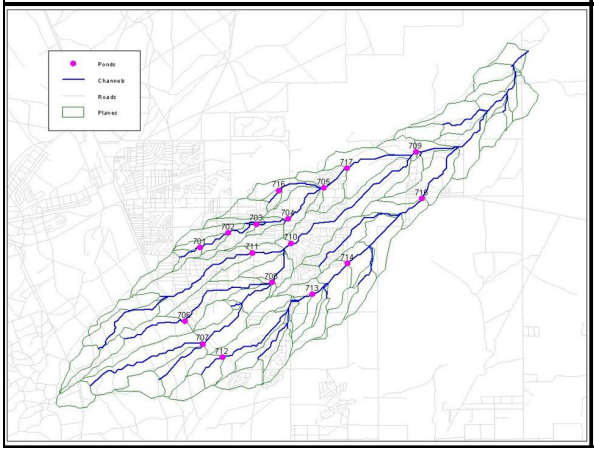
GeoSystems Analysis

Sierra Vista Storm Water Recharge Feasibility Analysis

GeoSystems Analysis, Inc.
USDA-Agricultural Research Service

Project Goals

- Evaluate the potential for stormwater capture ponds to increase groundwater recharge
  - Simulate stormwater runoff in a small Sierra Vista sub-watershed
  - Simulate runoff for wet, dry and average years
  - Evaluate potential infiltration and recharge
  - Compare scenarios with and w/o ponds



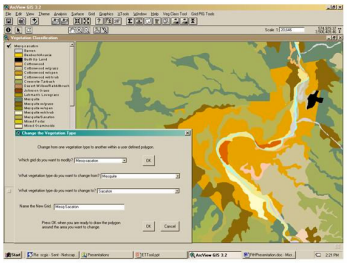
Project Status

- Model simulations are complete:
  - Infiltration increase due to ponds (different scenarios
    - Wet year = 350 to 1300 acre-feet
    - Average year = 300 to 1050 acre-feet
    - Dry year = 200 to 700 acre-feet
  - Six to seven ponds (of 17) capture > 60% to 70% of pond infiltration

INFORMATION NEED:

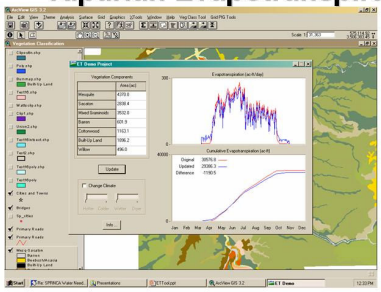
- What are the ET losses from mesquite bosques? From the entire riparian corridor?
- How do vegetation management actions affect this consumption rate?

GIS-based Vegetation Management and Riparian Evapotranspiration Tool



- **Determines how changes in riparian vegetation may alter total consumptive groundwater use**

GIS-based Vegetation Management and Riparian Evapotranspiration Tool



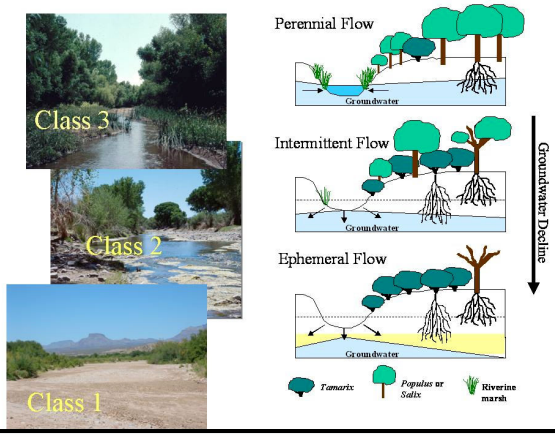
Shows original ET values in red, revised values in blue.

INFORMATION NEED:

- What are the water needs of riparian vegetation within the SPRNCA to ensure its long-term ecological integrity?

San Pedro River Water Needs

Dr. Julie Stromberg
School of Life Sciences
Arizona State University, Tempe AZ
+
ASU Life Sciences and Geography Dept. graduate students:
Sharon Lite, Ken Bagstad, Tyler Rychener, Liz Makings
+
Post-doctoral fellow: Dr. Mark Dixon



Main findings related to base flows and groundwater:

- Perennial (or near-perennial) base flows are needed to sustain the highest functional capacity of streamside vegetation
- Abundance and age class diversity of Fremont cottonwood, Goodding willow declines as groundwater depth across the floodplain exceeds ca. 3 m and flow frequency drops below ca. 75%, and dominance shifts to saltcedar.

INFORMATION NEED:

- What possible water conservation strategies could be pursued ?
- How do they all compare on a relative cost and water yield basis?

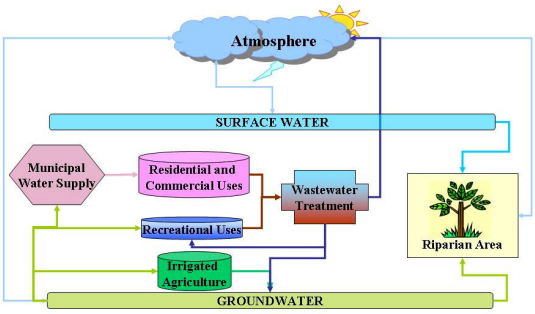
Preliminary Cost/Benefit Analysis for Conservation, Reclamation, and Augmentation Alternatives for the Sierra Vista Sub-watershed

Fluid Solutions
BBC Research and Consulting

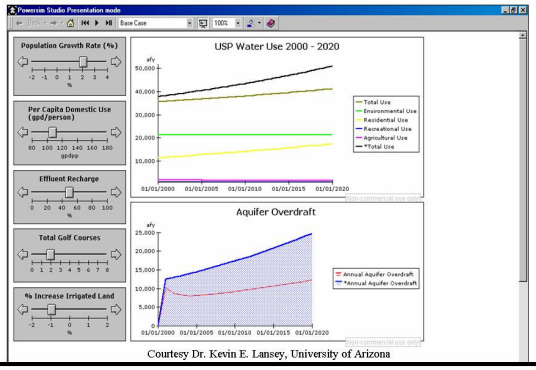
	Annual Yield (Ac/ft)	Annual Cost (capital, admin, ops)
Reduce charitable car washes	0.2	$5,000
Retire irrigated ag (easements)	2,600	$81,000
Recharge Sierra Vista wastewater effluent	4,000	$1,400,000

Evaluation of Conservation Measures in the Upper San Pedro Basin

Overall Water Balance



Prototype Interface for a San Pedro Decision Support System



Courtesy Dr. Kevin E. Lansey, University of Arizona

DSS- APPLICATION BENEFITS

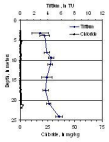
- Rapid evaluation of alternatives
- Assists in identifying critical factors for decision-makers
- Transparent model
  - No hidden numbers/equations
  - Easy to change values
- Collaborative development

INFORMATION NEED:

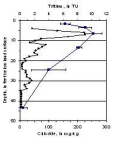
- What information is needed to update our groundwater model?

Deep Infiltration

- Ephemeral stream channels
  Deep infiltration readily occurs except where poorly permeable sediments occur within the root zone.



- Basin floor
  Deep infiltration of direct precipitation is not a significant recharge mechanism.

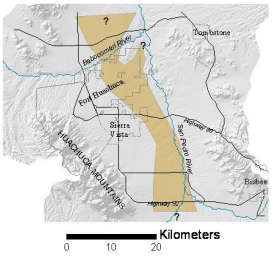


USGS science for a changing world

Distribution of Thick Silt and Clay Intervals in the Regional Aquifer

Detailed subsurface mapping of silt and clay along the river.

Better defined spatial distribution of silt and clay throughout Sierra Vista subwatershed.



USGS science for a changing world

LESSONS LEARNED: Integrating Science and Policy

What do policymakers really need from science?

- Accurate characterization of problems and potential solutions to inform public opinion
- Provides the mandate for necessary policies and projects

How do scientists benefit from working closely with decision-makers?

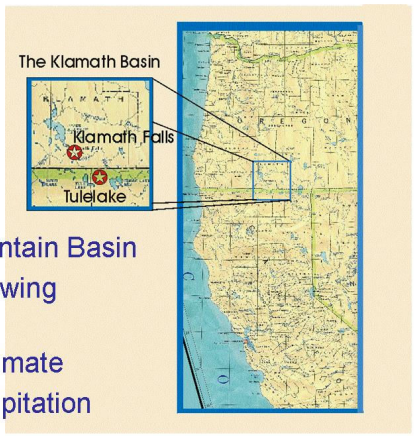
- Projects that address critical information needs readily attract funding
- Adaptive management process allows for real-life testing of hypotheses
- Improves our understanding of complex systems

Collaborative learning can be more important than any final report

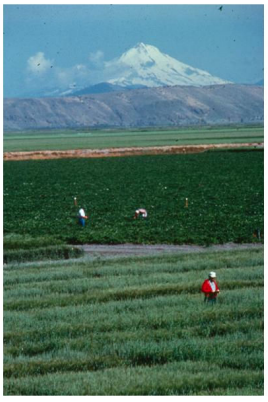
- Building a strong foundation of common understanding among key decision-makers regarding complex systems may be your ultimate "product".
- This "product" is difficult to measure, and not often recognized by agencies or academic institutions.

THE KLAMATH BASIN WATER CRISIS – ADMINISTRATION OF THE ENDANGERED SPECIES ACT LEADS TO A REGIONAL AGRICULTURAL DISASTER

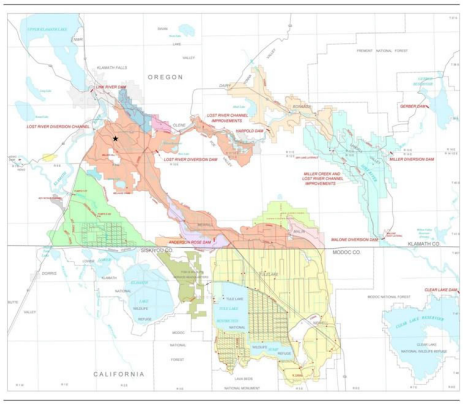
HARRY CARLSON, SUPERINTENDENT
SIERRA FOOTHILLS RESEARCH & EXTENSION CENTER
UNIVERSITY OF CALIFORNIA

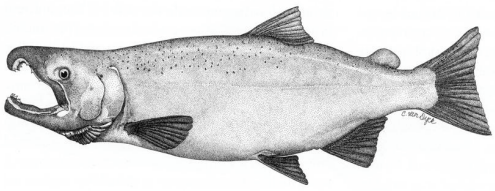


- High Mountain Basin
- Short Growing Season
- Desert Climate
- Low Precipitation



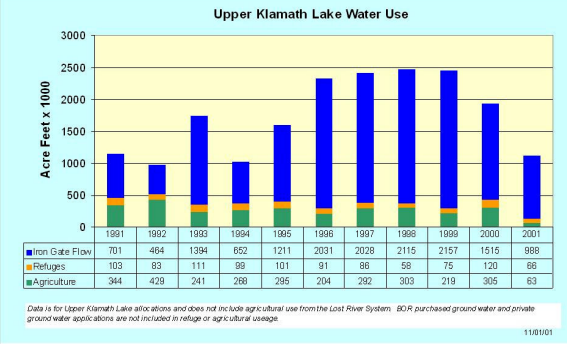
- Potatoes
- Onions
- Alfalfa
- Horseradish
- Peppermint
- Pastures
- Cereals
  - –barley, wheat, oats

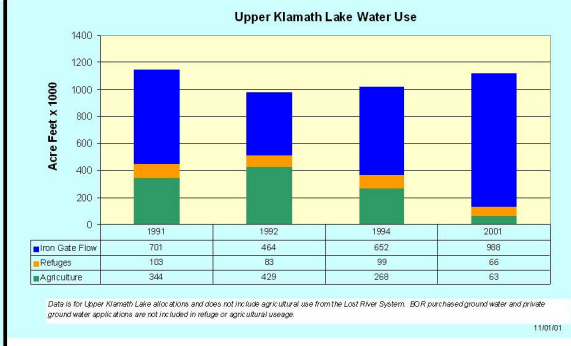




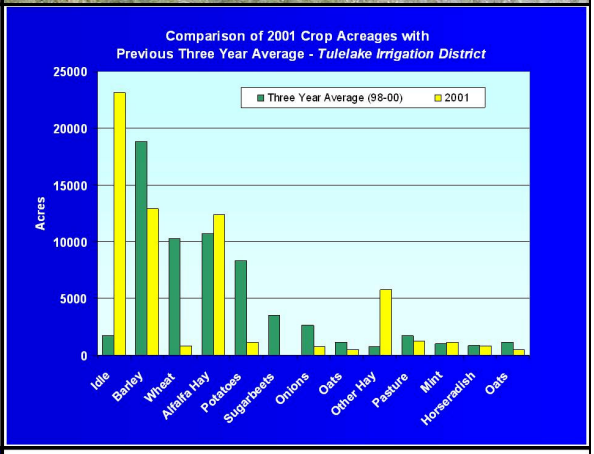
What happened in 2001Water Crisis

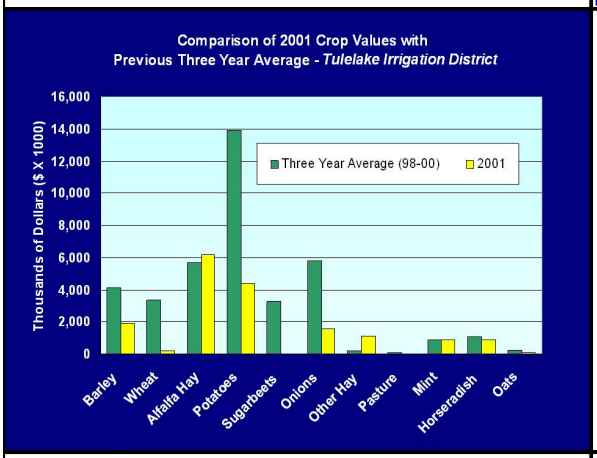
- New Biological Opinions issued for Sucker Fish and Coho Salmon
- Increased flow requirements in the Klamath River
- Increased lake elevation minimums in Klamath Lake
- All time record drought
- Zero agriculture allocation from Upper Klamath Lake





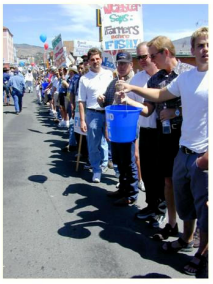
Dryland crops





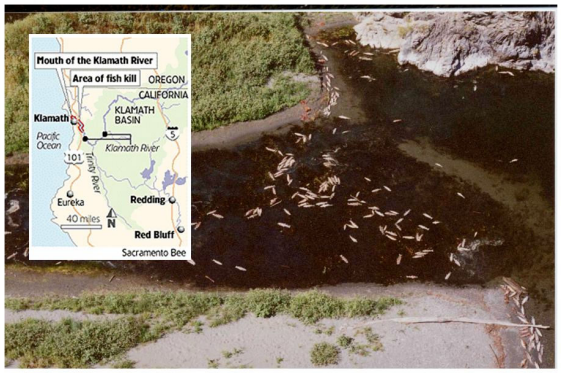
Ditches

Community Response



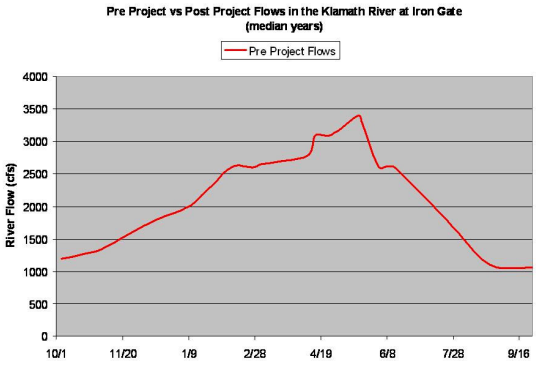
2002

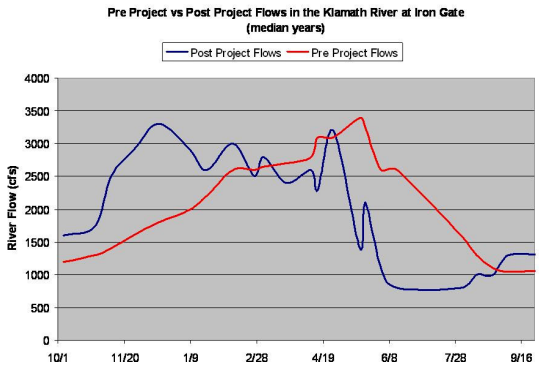
- Interim NRC report
- Improved weather and Klamath Lake inflow predictions
- New Biological Assessment by BOR
- Full allocation of Water to Agriculture
- BOR changes year type designation to "Dry" year.
- Klamath River Salmon Die-off

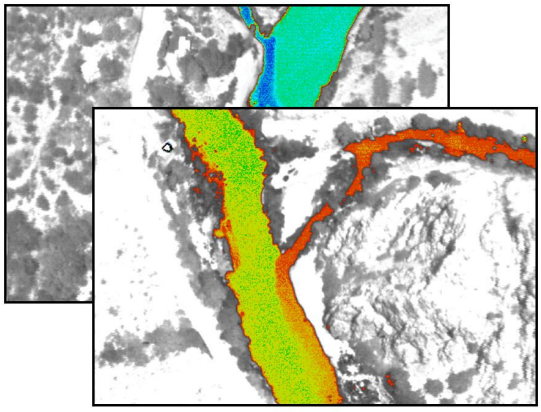


Major Issues - Salmon

- Increased flows for out-migration, in-migration, to cover spawning beds, to increase habitat, mitigate poor water quality
- Water quality. High Temperatures, low dissolved Oxygen (related to high productivity and high nutrient contents).
- Hatchery Programs.
- Tributary flows and water quality
- Trinity River Diversions into the Sacramento River







Major Issues - Suckers

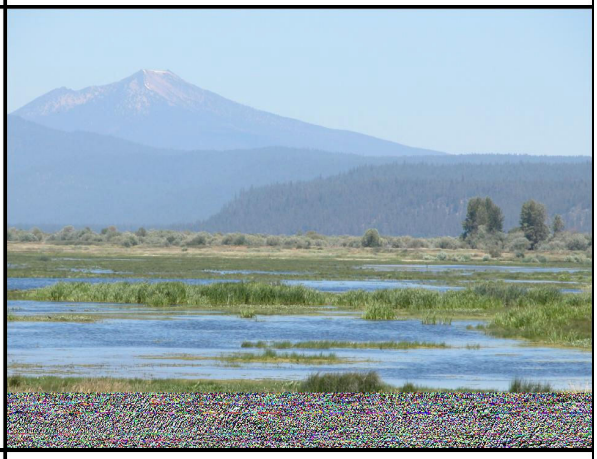
- Poor Recruitment
- Poor Water Quality – high P, Low DO, high pH and NH3
- High primary productivity
- Adult Fish Kills
- Lake Level Requirements – Refugia, Escape, Water Quality

Major Issues - Agriculture

- Water Quantity – Dependability
- Water Quality - TMDL's
- Water Conservation - Irrigation Efficiency
- Increased Storage
- Agricultural systems
- Rural Economies

Major Issues – Other Environmental

- Other listed or candidate species
- More Wetlands
- No Farming on the Refuges
- Return Basin to Original State



2003

- OSU/UC Assessment of 2001 Impacts
- Final NRC Report
- Biological Opinions Unchanged
- 50,000 acre foot water bank
- $50 Million in Farm Bill for irrigation efficiency
- End of May scare on violating ESA Lake elevation limits
- Farming disaster averted

Biological Opinions

- BO's are very controversial
- Lack of information and data
- Lack of peer review
- Based upon hypotheses and theories that are difficult to prove or on complex models that are difficult to calibrate and validate
- Data subject to multiple interpretations

Major Players

- Farmers
  - Agribusiness
  - Farm workers
  - Rural Communities
- Environmental Interests
  - Local, Regional, National
  - CWA, DU
- Government Agencies
  - BOR, NMFS, FWS
  - State and Local Government
  - NCRWQCB, DEQ
  - More then twenty government agencies with some jurisdiction on Upper Klamath Lake

Major Players

- Commercial and Sport Fishing interests
- Native American Tribes - Upstream and Downstream interests
- Judges
  - Law suits
  - Water Rights Adjudication
- Legislators
- Scientists
  - Agency
  - University
  - Tribal
  - Water User Consultants
  - National Academy of Science.

Role of Scientists

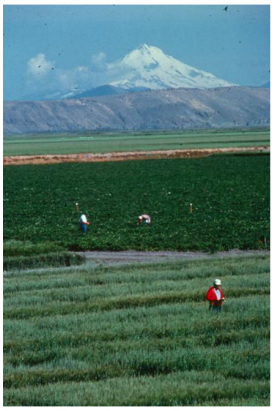
- **Unbiased**
  - The only people without bias, don't know anything… and they can't help us.
- **Objective**
- For balance we need scientists representing a variety of disciplines, perspectives and backgrounds.

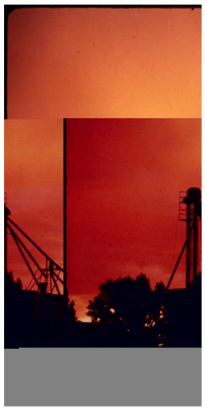
Role of Scientists

- Honest Broker of Information
- Independent Analysis
- Communication/Education

But…

- Data sets are huge and very incomplete
- Time pressures are very real
- Resources available to the task are limited
- **Political land mines are everywhere**

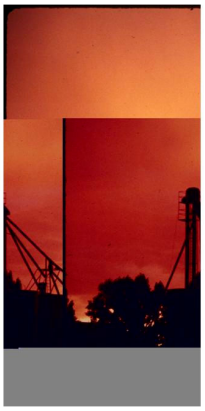


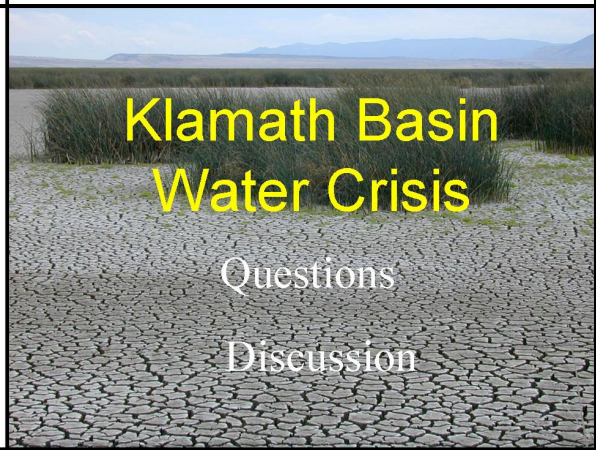


Lord, grant me the serenity to accept the things I cannot change,

The courage to change the things I can,

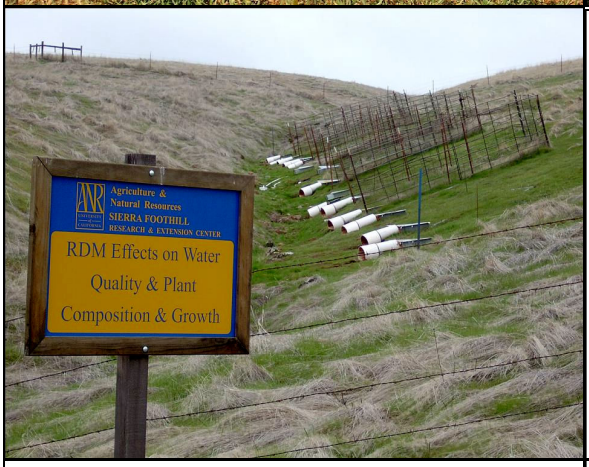
And the wisdom to know the difference.





AN AG ADVISORY COMMITTEE FOR ASSISTANCE IN MANAGING NATURAL RESOURCES AT A FIELD STATION

MIKE CONNOR, SUPERINTENDENT
SIERRA FOOTHILLS RESEARCH & EXTENSION CENTER
UNIVERSITY OF CALIFORNIA



Summary of Issues

- Clearing of oak trees
- Plant species of interest/weeds
- Animal habitat (including listed spp.)
- Research needs
  - More clearing vs. less modification
  - More forage vs. more ungrazed areas
- Water quality protection

Natural Resources Management Advisory Committee

- Appointed by Center Superintendent
- Advisory to the Superintendent
- Made up of UC researchers
  - Faculty and C.E.
  - Center researchers and non-researchers
  - Range, Animal Science, Hardwoods, Water, Wildlife, Weeds

Natural Resources Advisory Committee

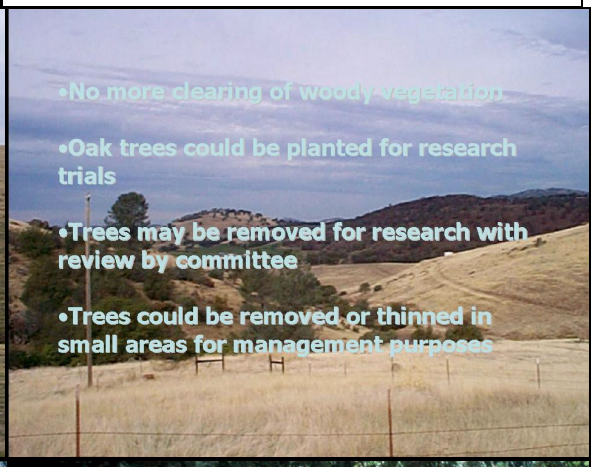
- Meetings as necessary
  - Several times/year or 1 time in two years
  - Called by Supt. or committee chair
- Formal meeting with agenda and minutes
- Recommendations by consensus
- Admin. duties by Center staff
- Supt. provides follow-up reports on recommendations

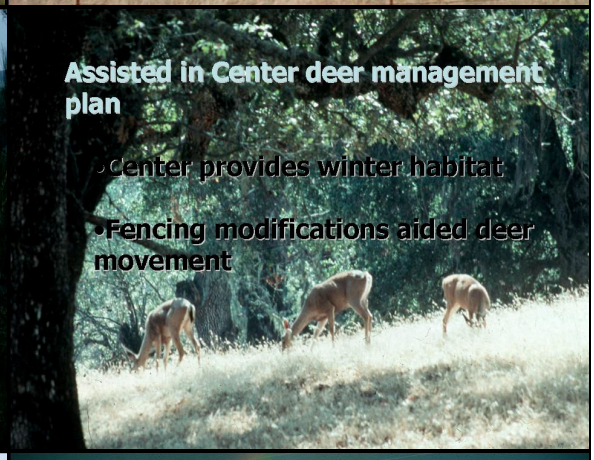
Why Have a Natural Resources Committee?

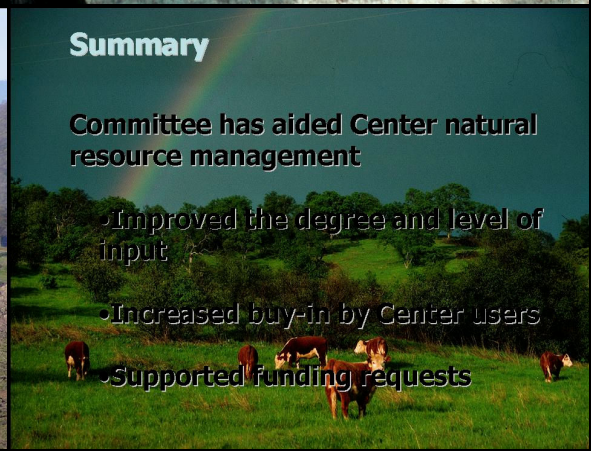
- Input from a broader range of people
- Increase the expertise level
- Improve buy-in from those affected
- Gain support for supplemental budgets

Challenges to Having a Natural Resources Committee

- Everyone can't be satisfied
- Budgets may not support a sound recommendation
  - E.g., vegetation type survey







AGRO-TERRORISM AT AG RESEARCH STATIONS

JIM BEATY, SUPERINTENDENT
AGRONOMY RESEARCH CENTER
PURDUE UNIVERSITY

Preventing Agroterrorism at Ag Research Stations

Jim Beaty, Purdue University for RCAS

Adapted from
Agro-terrorism Past, Present and Prevention
Ronald Turco,Purdue ARP

When you take risks you are exposed to Danger!

Use
*Training
*Experience
*Planning &
*Technology
to reduce risks

Agricultural Research Facilities

- Safety vs Security
  - Unintentional Intentional
- Safety
  - Events like fire, wind, flood, accidents
    - Occur during working or nonworking hours
- Security
  - Events like theft, arson, crop destruction

Threat + Vulnerability = Security Risk

- Threat: a person or one intent on stealing or destroying property
- Vulnerability: an exploitable security deficiency
- Risk: potential loss or damage to assets

Agricultural Research Facilities

- Assessment of facilities
- Protection
- Response
- Preventive mechanisms

Agricultural Research Facilities

- Open to the public — Low risk
  - Visitors welcome — Highly susceptible
    - Self guided tours
- Limited access
  - Limited to working hours
- Restricted access — High risk
  - Fenced, gated, guarded — Lowly susceptible
    - Primate Lab at UC-Davis

Agricultural Research Facilities

- Security: Who are "THEY"?

Agricultural Research Facilities

- Security: Who are "THEY"?
- The Mischief Maker

Historic UI corn plot damaged by vandals

■ Stalks in field were stomped to form crop circle

By CHRISTINE DES GARENNES
News-Gazette Staff Writer

URBANA — An unidentified group of people damaged the historic Morrow Plots at the University of Illinois recently when they stomped down a number of corn stalks.

The Morrow Plots are the oldest agronomic experiment fields in the United States and include the longest-term con-

Vandals crushed stalks of corn to form a crop circle at the Morrow Plots on the University of Illinois campus in Urbana. The circle measured about 25 feet in diameter.

Dunker said the stalks were crushed in a circle that measured about 25 feet in diameter. Dunker was alerted to the

that Dunker has managed the plots, he has not seen any vandalism to the plots other than the occasional report of a sto

Agricultural Research Facilities

- Security: Who are "THEY"?
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- The Naïve Trespasser

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- The Thief
- The "Meth" Druggest

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- The Computer "Hacker"

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- The Computer "Hacker"
- The "Home Grown" Extremist

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- The Computer "Hacker"
- The "Home Grown" Extremist
- The Terrorist

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- The Computer "Hacker"
- The "Home Grown" Extremist
- The Terrorist – State Reports

Agricultural Research Facilities

- Security: Who is biggest "THREAT"?
- The Mischief Maker
- The Naïve Trespasser
- The Thief
- The "Meth" Druggest
- The "Disgruntled" Employee or Ex-employee
- The Computer "Hacker"
- The "Home Grown" Extremist
- The Terrorist

Agricultural Research Facilities

- Security: Who is biggest "THREAT"?
- The Terrorist!
  - Dealing with a very unlikely event, that could have catastrophic consequences
    - Not with explosions or guns
    - But with Agro-bio-terrorism

Agro-bio-terrorism

The use, or threatened use, of biological (including toxins), chemical or radiological agents against some component of agriculture in such a way as to adversely impact the agriculture industry or any component thereof, the economy, or the consuming public.

-- R.G. Davis, Iowa State University

Defining Words

- Biological Agent: a microorganism (or toxin derived from it) which causes disease or deterioration in humans, animals, or plants.
- Biological Warfare: the employment of biological agents to produce casualties in humans, plants or animals.
- Biological Weapon: is an item or material which projects, disperses or disseminates biological agents. (Infected or non-infected insects can be weapons.)

Ancient History of BioWeapons

- Roman Army used dead animals to foul water supplies.
- "Black Plague" (*Yersinia pestis*) was a consequence of bio-weapons.
  - In 1346, during the siege of Kaffa the Tartars catapulted bodies infected with plague over the city's walls.
  - Kaffa was the gateway to the Silk Road trade route.
  - Secondary transfer, through rats and fleas, spread Plague to Italian ports and the rest of Europe, killing 25 million.

Ancient Bioweapons

cont.

- In 1710, Russia used plague (*Yersinia pestis)* victims as weapons.
- During French-Indian war (1767),
  - British Army provided Native Americans with blankets from a hospital where smallpox patients were being treated.
  - Major impact on the entire Native American population.

Modern Bio-Weapons

- The present *era* started in 1918.
  - Japanese Army established *Special* Unit 731 (human) and Unit 100 (anti-crop & anti-animal)for Bioweapons.
  - Units were expanded and moved to Manchuria in 1931.
- First use of Modern *Weaponized Bioagents* occurred in 1942 with the aerial application of plague *and other agents* during attacks on China.
- Plague infected fleas in the Hunan province
  - Thousands of Chinese killed by the products of Unit 731

Unit 100 Program

- Anti-Crop Bioagent Program
  - Worked with fungi, bacteria, nematodes
  - Tested against grain and vegetable crops
- Unit 100, Program developed an aerial dissemination method.
  - Used to spread infected millet and cotton
  - Used to spread Anthrax and Glanders

Germany

- WWII
  - Developed but did not use FMD
  - Developed and may have used:
    - Wheat rusts
    - Corn and Rapeseed beetle
    - Colorado potato beetle
    - Blights for assorted other crops

Germany

- WWI
  - Anthrax, Glanders (*Burkholderia mallei*) developed and used
    - Attack horses and mules of the allies
    - Sheep
    - Cattle
    - Raindeer
  - Wheat fungi (*Pucinia graminis*)

British Program

- Started in ~1937
- Developed Anthrax laced cattle cakes (5 million)
- Worked with foot-and-mouth (FMD), Plague, and bio-toxins.
- Considered an aerial attack of Europe to kill all farm animals – *Operation Vegetarian*

U.S. and Soviet Union Programs

- Both accelerated ~1942.
  - Both were "ramped up" in response to the perceived threat posed by German and Japanese programs.
  - Both programs were accelerated in the 1950's using captured axis data and scientist (U.S. immunity deals).
- US program developed at Ft. Detrick and used "surrogate biological agents" as model weapons.
  - 3,500 People and 250 buildings on site
  - Some testing was done:
    - *Serratia marcescens* was sprayed over San Francisco (1950)
    - *Bacillus subtilis* released into the New York City subway (1966)
    - Other testing of delivery methods conducted.
- No offensive use of BW by the U.S. has been reported
- US/Soviet Program "ended" in 1972

U.S. Program

- During WWII, U.S. program developed at least 10 different biological agents.
  - Anti-animal agents
    - FMD
    - Newcastle
    - Fowl Plague
    - Hog Cholera
  - Anti-plant agents
    - Wheat/cereal stem rusts
    - Rice blast fungi
    - Wheat blight
    - Late blight
- US gave consideration to attacking Japan's rice crops..

U.S. Program

- Post WWII (1951-1969) {Accelerated,1950-53}
- U.S. carried out:
  - 31 Anti-Crop tests
- Most successful tests:
  - Wheat stem rust; developed some 30,000 kg of the (*Puccinia graminia*)
  - Rice blast fungus (*Piricularia oryzae*)
- Recently acknowledged, the CIA was capable of using the technology

U.S. Program

- Crop Agents
  - Soybean
  - Sugar Cane
  - Sweet Potatoes
  - Corn
- Animal/Human agents
  - Glanders
  - Plague
  - Q Fever
  - Cholera
  - Shigella
  - Yellow Fever
  - Dengue Fever
  - *Mosquitoes* as delivery mechanisms

Soviet Union Programs

Consider by many as the most innovative and offensive "anti-crop and anti-animal" programs in the World.

- Started in 1928
  - Typhus used as weapon
- WWII
  - Tularemia used on German Troops
- A *massive* Soviet post-WWII BW program was developed at many locations within Soviet Union.
  - Reformed as Biopreparat in 1973 over 60,000 workers in the Bioweapon program

Soviet Program

- **Anti-Crop Program**
  - Psittacosis (*Chlamydia psittaci*)
  - Wheat Fungal & Brown Leaf Rust
  - Rye Blast
  - Rice Blast
  - Anti-Corn agents
  - Wheat and Barley mosaic virus
  - Potato virus
  - Tobacco mosaic virus
  - Brown grass virus
- Used insects to transmit plant pathogens
- **Anti-Animal Program**
  - FMD
  - African Swine Fever
  - Anthrax
  - Newcastle disease virus
  - Vesicular stomatitis virus
  - Contagious bovine pleuropneumonia
  - Rinderpest
  - Avian Influenza
  - Ecthyma of sheep
- Used ticks to transmit ornithosis to chicken

Summary of Soviet Program cont.

- Strains were genetically altered to increase potency or resist antibiotics and vaccines.
- At least four labs developed anti-crop and anti-animal agents for warfare.
- Developed a large capacity to produce infected insects.

Why Bioweapons?

- The events leading up to the use of biological weapons would most likely occur during "**asymmetric warfare.**"
- Small non-nuclear powers or militant group attacks a major power using bioweapons in order to inflict mass casualties or economic problems.
- Efforts are not expressed until hours or days after the dissemination.

Key Steps

- Obtaining/modifying an appropriate pathogen
- Knowing how to handle the strain correctly and safely
- Knowing how to grow the strain to produce the appropriate characteristics
- Knowing how to store the strain, and how to scale-up production
- Knowing how to deploy the strain properly

Key Point

- There is/was a lot of it around.
- Some of it is easy to make, but hard to deploy.
- Could your Grandmother make it?

Attacking America's Food

- In 1984 the Bhagwan Rajneeshee in The Dalles, Oregon and Antelope, Oregon. (Wasco county) used bio's
- From August 29 until September 17, 1984, the group spiked salad bars, door handles, and drinks with *Salmonella typhimurium* to just to *test* their bio-weapons idea.
- At the end of September, **751** people confirmed with *Salmonella* infections.

Ma Anand Sheela

http://www.empirenet.net/imageworks/Raj1.htm

Agricultural bioweapons deployment:

- Direct contamination of food or water supplies, which are ingested by the victims
- The release of infected vectors, such as mosquitoes or fleas, which then bite the victims
- The creation of an aerosol cloud (or particles), which can be inhaled (or contact) by the victims
- If the targets are plants or animals, the cloud then settles on and infects the target.

Agro-Terror

- Destabilize government using food shortage or disruption.
  - Kenya, Sri Lanka
- Destroy food supply for an existing Army
- Cause economic disruption or Economic Warfare
  - 31% of US GNP comes from Agricultural activities and Food production

Agro-Terror Why?

- Bioagents are not that hazardous to the user (in most cases)
- Low Level technology
  - Takes some skill to get the same quality all the time
- Ag targets have low security levels
  - Crude dispersal on small scale
- Low moral barrier to use of the weapons
  - Corn vs people
- Economic warfare only requires limited success to achieve huge impact.

Responses to Terrorism are diverse and confusing...

"Cat herding at the goat rodeo"

Ag Research Center Issues

- Safety
- Security
- The conflict of Safety vs Security
- "Tell all" signage for first responders vs "target on barn"

Security Strategies and Measures

- Deterrence
- Detection
- Delay
- Respond

Security Strategies and Measures

- Deterrence
- Detection
- Delay
- Respond

Security Strategies and Measures

- Assessment; vulnerabilities vs. threats
- Protection and detection systems
- Intervention strategies
- Response and preparedness
- Preventive mechanisms
- Education and communication

GUIDELINES FOR FIELD TRIALS WITH TRANSGENIC PLANTS

GARY LEMME, ASSOCIATE DIRECTOR
AGRICULTURAL EXPERIMENT STATION
MICHIGAN STATE UNIVERSITY

Best Management Practices Guidelines for Field Trials with Transgenic Plants

Gary Lemme
Associate Director, Michigan Agricultural Experiment Station

Research Center Administrators' Society
2003 Annual Meeting

Best Management Practices Guidelines for Field Trials with Transgenic Plants
Draft

National Agricultural Biotechnology Council (NABC)

Presentation Objective:

- Increase awareness of guidelines being proposed for transgenic plant field trials
- Seek input from research center administrators on the implementation of proposed guidelines

National Agricultural Biotechnology Council

- Not-for-profit consortium of 37 agricultural research and teaching governmental agencies/institutions/universities
  - Most land grant universities are NABC members
- Objective: provide all stakeholders the opportunity to speak, to listen, and to learn about issues surrounding agricultural biotechnology
- www.cals.cornell.edu/extension/nabc/index.html

Transgenic Crops' Role in Global Agriculture

- 2003: 167.2 million acres in GM crops globally
- Grown by 7 million farmers in 18 countries
- 2002-03 growth in acreage
  - 10.8 million in developing countries
  - 11.3 million in industrial countries

Global Status of Commercialized Transgenic Crops; Crop Biotech Network, 1-14-04.

2003 Global Distribution of Commercialized Transgenic Crops

Country	Million Acres
USA	105.7
Argentina	34.3
Canada	10.8
Brazil	7.4
China	6.9
South Africa	0.9

Global Status of Commercialized Transgenic Crops; Crop Biotech Network, 1-14-04.

Why have field trial guidelines?

- To assist research institutions, researchers, and managers to conduct safe and effective small plot field trials with noncommercial transgenic plants
  - Does not apply to federally approved commercial transgenic plants
- Establishes accepted standards
- Communicates institutional commitment to excellence and responsible science

Public Review

- Guidelines shared with plant-research societies
- Reviewed by USDA/APHIS, FDA, and EPA
- Reviewed by NABC member institutions
- Draft 7 to be considered by NABC members at national meeting

Areas Addressed

- Application
- Approval
- Training
- Record-keeping
- Communications
- Storage
- Disposal of biological materials
- Equipment management
- Field-site selection
- Monitoring
- Testing
- Reporting

Risk-Based Guidelines

- Stringency increases from self-pollinating to out-crossing species
- Stringency increases from low-risk to high-risk transgenics

Low Risk Transgenic Plant

- Requires only notification of APHIS
- Parent plant is well established food, feed or fiber crop (not exotic or noxious)
- Transgenic plant is substantially similar to parent
- Prior greenhouse testing recommended
- Prior chemical characterization recommended

Medium Risk Transgenic Plant

- Requires APHIS permit and possibly EPA approval
- Introduced gene has less known function or has unknown tolerance level
- Transformed parent is less known crop but not invasive or noxious
- Greenhouse tested, contains no alterations in toxicants or allergens

High Risk Transgenic Plant

- Transformed plant synthesizes pharmaceutical or industrial products
- Requires APHIS permit and/or EPA or FDA review
- Involves an exotic or noxious plant

Permit Application

- Prepared by principal investigator
- Approved by Institutional Biosafety Committee (IBC)
- Relevant scientific information
  - Method of transformation
  - Proteins produced
  - Parent plant and source of transgenic material
  - Growth characteristics (pollination mechanisms, compatible indigenous species)
  - Expected benefit of field trial
- Incident communication plan

Approvals

- External agency approval
  - Ranges from notification to permits
  - USDA/APHIS, FDA &/or EPA
- Institutional approval by IBC
- State & local approval as mandated
- Intellectual property & material transfer agreements as appropriate

Training

- All personnel (PI-students, tech. & farm managers) trained prior to field trial
- Training includes:
  - What transgenic plants are
  - Necessity for field containment
  - Potential sources of contamination/risk in field experiments
  - Familiarity with guidelines
  - Protocol for reporting problems
- Provided by the research institution

Record Keeping

- Secure hard copy &/or electronic form
- High risk transgenics:
  - Site location, distance from other experimental and commercial plants
  - Dates (planting, treatments, observations, tests, harvest)
  - Storage site
  - Location & method of disposal
  - Monitoring & treatments of site for 2 years post field trial
- All field operations recorded, dated, signed & witnessed
- Complete file of current and past field trials at research location and a central information repository

Storage

- Dedicated facility, area or container
- Medium & high risk material locked
- Each transgenic physically separated
- Labeled for immediate identification as transgenic material
- Complete inventory over time

Post-Harvest Disposal

- Disposed in accordance with permit
  - Low risk: landfill dumping & burial
  - Medium & high risk: autoclave or incinerate
- No co-mingling with non-transgenic or commercial material
- Cleaning methods as approved by IBC

Equipment Management and Cleaning

- Dedicated seed processing, containers for transporting, planting & harvesting (required for high risk)
- Avoid cross-contamination
  - Thorough cleaning, IBC approved protocol
- High risk protocols approved by APHIS
- Refuse material disposed appropriately

Field Site Selection

- Assigned by Farm Manager
- Follow set-back requirements within farm and with neighbors
- Consider post field trial restrictions
- Inform neighboring farmers in writing in advance of field trial

Monitoring

- PI and Farm Manager jointly responsible
- APHIS random monitoring of low and medium risk field trials
- High risk trials - APHIS monitored 5x during field trial and 2x in following year
- High risk trials fallow for 2 years post field trial

Testing

- Transgene testing recommended for low & medium risk plants
- Transgene testing required for high risk plants
- Test target and buffer plants

Reporting

- Must report to IBC and approving agency
  - Unusual or unexpected occurrences
  - Breeches of protocol (immediate reporting)
- Established incident report plan
  - IBC approved plan

Field Containment

- Case-by-case procedures
- Consider
  - Biological and physical containment
  - Pollen movement
  - Compatible indigenous plants
  - Bird, insect, animal, and human access
- Geographic isolation, fences, nets, pesticides used as appropriate
- Limit bioterrorist access

Institutional Review

- Optional and Requested by institution
- NABC appointed review team
- 2-day on-site review of procedures, facilities, and protocols
- Costs borne by host institution
- Written report provided

Conclusions

- Submit review comments to your NABC representative; generally agricultural experiment station director or dean
- Guidelines reflect good science and state of knowledge
- Guidelines provide public accountability
- Guidelines should facilitate advances in agricultural biotechnology

Thank You

Gary Lemme
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Michigan State University
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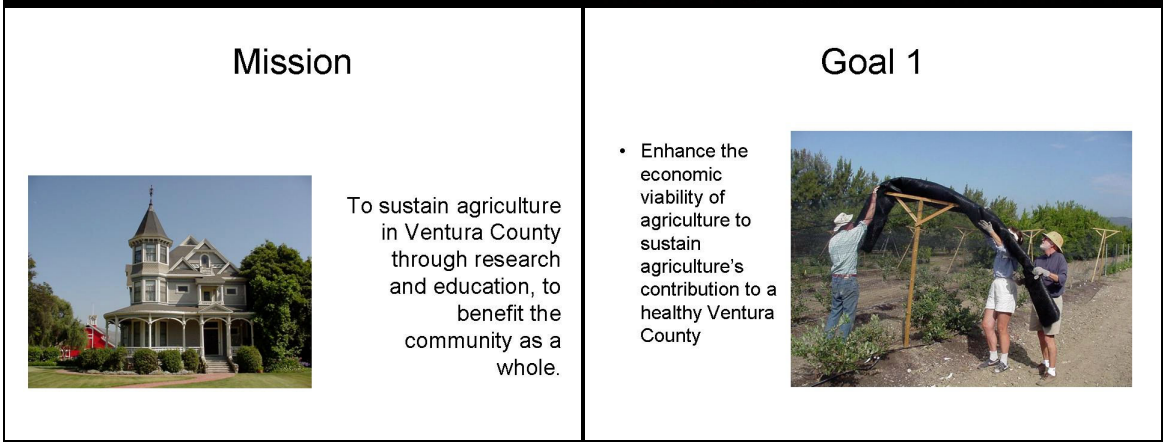
BUILDING BRIDGES – MOVING BEYOND TRADITIONAL OUTREACH

SHERI KLITTICH, PROGRAM ADMINISTRATOR
UNIVERSITY OF CALIFORNIA HANSEN TRUST

The Hansen Trust was created in 1993 when Thelma Hansen left an endowment to the University of California "to sustain agriculture in Ventura County (CA) through research and education to benefit the community as a whole." Programs have been developed and implemented to achieve the Trust's three goals involving economic viability; agricultural literacy; and improved policy, particularly at the ag/urban interface. Early on the Hansen Board and community leaders identified outreach and education as the special niche the Trust should target. Ag literacy programs include school field trips, teacher training, career days, mini grants, garden-based learning resource center and the support of farm-to-school programs. Families and the general public are brought to the farm for the Pumpkin Patch in October, and FarmFest each April. These programs have increased awareness and relevance of agriculture as a business, source of food, and quality of life. With ten distinct cities, each separated by agricultural land, there is a large ag/urban interface in the county. In 1999, the agricultural industry recognized that a broader community commitment to the maintenance of agriculture was needed, and that the industry must make the environmental and health concerns of non-farmers a high priority. The Ag Futures Alliance began in 2000, and has met monthly since. Approximately 20 stakeholders representing a diversity of viewpoints have agreed upon a common purpose: To support and enhance an interdependent and viable agriculture in Ventura County in perpetuity through an alliance that values dialogue and cooperation and where a diversity of affected views and interests are represented. The group has representatives from various facets of agriculture, labor, environmental and civic organizations, and spent a year developing a constitution and positive relationships. Each year since, the group has tackled a critical agricultural issue and come to a consensus on the principles involved and suggested actions. Interested parties can learn more at http://hansentrust.ucdavis.edu or http://www.agfuturesalliance.net/ventura/ .



Goal 2

Increase the public's understanding and support of agriculture, including the relationship of agriculture to the economy and the natural resource base.

Goal 3

Encourage the study, discussion and debate of agricultural issues for better policy decisions and achieving balance among competing interests.

Research

- Research Competitive Grants Program
- Onsite research at Center
- Support of Staff Research Associates for Cooperative Extension

Agricultural Literacy

A basic knowledge of our food and fiber system, including history, economics and cultural implications…what every person should know about agriculture, but usually doesn't these days

School/Youth Gardening Support

Direct support for school/youth gardens has made a major impact on garden-based programs in Ventura County:

Educational Mini-grants
The garden-based learning library
Plant Give-Away
Demonstration Areas

Training

A second big effort in programming is devoted to training:

Teachers' Agricultural Seminars
Gardening Basics Workshops

Community Events

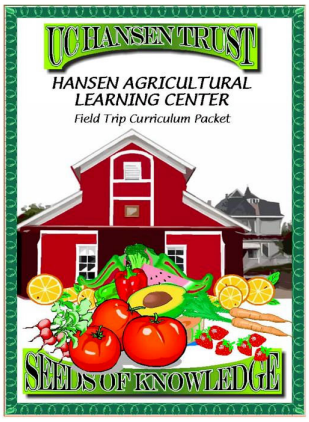
Community events open the farm to the general public:

Pumpkin Patch Harvest Festival –
now in its 30th year.

Field Trips

Seeds of Knowledge is an all day experience and requires prior classroom activities, on-the-farm hands-on agronomy lessons, and post-visit follow up extensions.

Harvest Field Trips are devoted to harvesting a crop as a component of the Farm-to-School program, which includes Salad Bar from local growers, nutrition and garden-based education, and farm visits.



Harvest Field Trips

Fall Harvest Activity

Farm to School

Agricultural Issues

- Ag Literacy & Issues Competitive Grants Program
- Highlight one program that deals with our theme of "building bridges"

Ventura County Ag Futures Alliance
(www.agfuturesalliance.net)

In 1999, the agricultural industry recognized that broader community commitment to maintenance of agriculture is needed, and that the industry must make the environmental and health concerns of non-farmers a high priority

Ventura County Ag Futures Alliance

Purpose

- To support and enhance an interdependent and viable agriculture in Ventura County in perpetuity through an alliance that values dialogue and cooperation and where a diversity of affected views and interests are represented.

Ventura County Ag Futures Alliance

- Monthly meetings
- 15-20 members representing farmers, labor, environmentalists, civic leaders, health and education
- Developed constitution how we will talk with each other – build consensus
- Have focused on one issue per year

Ventura County Ag Futures Alliance

ISSUE #1

Farming Near Schools: A Community approach to Protecting Children

The Goal: to Minimize agricultural chemical exposure to children, faculty and parents at schools adjacent to agricultural operations through communication, education, incentives and regulations

Ventura County Ag Futures Alliance

ISSUE #2 Farm Worker Housing:

A Crisis Calling for Community Action

Goal: that every farm worker have shelter which provides basic amenities and security of self and possessions at a cost not to exceed 30% of the worker's gross earnings

Ventura County Ag Futures Alliance

ISSUE #3: Land Use Principles to Achieve Agricultural Sustainability in Ventura County

Goal: Identify a consistent set of principles to minimize ag/urban conflicts and support continuation of agriculture, and encourage adoption and use of these principles by the county and cities

Guiding Principles for Conflict Management (what works)

- Listen and speak with respect
- Work to respect and include special interests
- Work for consensus based solutions (reality based, least harmful, interdependent and sustainable)
- Honor innovation and fresh approaches
- Provide information
- Promote cooperation and collaboration

INTERACTIVE DESIGN PROCESS FOR THE KEARNEY RESEARCH GREENHOUSE FACILITY

FRED PERRY, DIRECTOR
RESEARCH & EXTENSION CENTERS
UNIVERSITY OF CALIFORNIA

UNIVERSITY of CALIFORNIA
Agriculture & Natural Resources
Research & Extension Centers

KREC
GREENHOUSE/HEADHOUSE FACILITY

DESIGN PROCESS

UC FUNDING PROJECT DEVELOPMENT PROCESS

- 5 YEAR MAJOR CAP IMPROVEMENT PLAN
  - First entered 1994/95 $1.6 mil, 11,000 asf
  - Funded 1999/00 $2.8 mil, 16,600 asf
- PROGRAM PLANNING GUIDE
  - Submitted 18 months before funding
  - Finalizes scope and budget
  - Reviewed and approved by State

DESIGN PROCESS

- PHASE I – SITE VISITS
- PHASE II – DEVELOP PROGRAM PLAN
- PHASE III – PRELIMINARY DESIGN
- PHASE IV – DESIGN & CONSTRUCTION DOCUMENTS PREPARATION

PHASE I – SITE VISITS

- IN-HOUSE COMMITTEE
  - Superintendent
  - Greenhouse Manager
  - REC Director
- INSTITUTIONAL AND COMMERCIAL
- ON-SITE VISITS AND REMOTE COLLABORATION
- GENERAL DESIGN OVERVIEW
- WHAT WORKS AND WHAT DOESN'T
- RELATIVE COSTS AND COST TRADE-OFFS
- OPERATING PROCEDURES

SITE LOCATIONS

- WSU - Puyallup
- UW
- Nurserymens - Half Moon Bay
- UCB: Gill & Oxford Tracts, Albany
- UCD: Botany & Plant Science, Veg. Crops, and Environ. Hort.

WSU - Puyallup

- 13,500 s.f. greenhouse, 15 compartments
- 5,500 s.f. headhouse
- Shared wall compartments
- Access through common corridor/plenum
- Double-wall polycarbonite walls and roof
- $2.3 million

WSU - Puyallup

- Knee walls, very expensive
- Concrete floors, algae problem
- 15% stationary, 85% rolling benches
- Wastewater goes to tank than to city sewer
- One side manual ridge vent for emergency
- No special water systems
- Pad cooling, problems with narrow modules

University of Washington

- Renovated, replaced overlap glass with framed laminated glass
- GH corridor
- Concrete floors
- Cooling w/high pressure fog, high maint.
- Shade curtains
- Metal benches, ebb and flow benches

Nurserymens Exchange

- Large commercial in Half Moon Bay
- Utilize Holland technology
- Big, open houses, old structures reglazed with polycarbonate, new houses all glass
- Automated, robot systems
- Prefer 14 - 16 foot sidewalls for heating and cooling control

Nurserymens Exchange

- Hotwater heating, fog & passive cooling
- Shade curtains and HID lights
- Uses black-out curtains for some applications
- Swimming pool chlorine 50/50 mix for cleaning
- Vaporized sulfur for pathogen control

UCB - North GH Facility

- 10 modules, 20'x50', glass, shared side walls, connected to HH and air intake plenum on north wall
- HH ~8,000 sf, loading dock,haz. mat. storage,dirty work area,two small dry labs, large teaching lab,cold room,restrooms w/showers

UCB - North GH Facility

- Concrete floor too slippery, too flat
- Rolling benches
- Wastewater to city sewer
- Gutter height 10', would like higher
- Intake and exhaust screened, inlet filtered
- Furnish DI, industrial, std. Fertilizer mix water

UCD - Botany & Plant Science

- Has both glass and plastic, prefers glass, for maintenance reasons
- Prefers concrete floors but need adequate slope and cleanable drains
- Prefer 12' gutter height
- DI, Industrial, Std. House fertilizer mix
- Oversize cooling

UCD - Veg. Crops

- Concerned about security, have installed chain link fence with motion detectors
- Charges $1.25/sf/yr, supplies consumables, pest control joint effort
- 90% occupancy, some assigned, some allocatable/scheduled
- Need backup power

PHASE II – PROGRAM PLAN

- RESEARCHER/USER COMMITTEE
- RESEARCHER/USER INPUT
- IN-HOUSE STAFF ANALYSIS AND INPUT
- INTERACTIVE DEVELOPMENT OF PROGRAM PLAN
- INTERACTIVE DEVELOPMENT OF DESIGN FEATURES

PROGRAM PLANNING COMMITTEE CHARGE:

- Define program needs
- Determine space needs to meet program needs
- Operational requirements
- Develop Detailed Program Plan (DPP)
- Provide input during final design
- Develop operation procedures

KEARNEY RESEARCH & EXTENSION CENTER
GREENHOUSE QUESTIONNAIRE

INTRODUCTION

The intent of this questionnaire is to collect program specific information from potential users of the existing and new greenhouses and headhouses. This information is required to determine the program requirements that will provide the basis for the design and operations of the new and existing facilities. Detailed responses are essential to this process. (For example, maximum plant height, temperature range, supplemental lighting, shading, day length and relative humidity requirements may alter the gutter height requirement(s). This greenhouse facility is not intended for research requiring quarantine or levels 3 to 4 containment.

We need each project leader with potential greenhouse activities to respond to the following questions as thoroughly as possible. Many of the responses will require your "best guess" of future activities.

GREENHOUSE USER'S QUESTIONNAIRE

1. Briefly describe your research/extension activities (scope and objectives) that require greenhouse facilities.
   a. Current research/extension
   b. Future research/extension
2. How does your greenhouse related activity contribute to your program goals?
   a. Current research/extension
   b. Future research/extension
3. Estimate the amount of greenhouse space required to support your research program.

	a. Current	b. Future
Total floor level growing area (sq. ft)		
Total stationary benches (lineal ft)		
Total rolling **benches** (lineal ft)		
Floor growing area width (ft)		
Bench width (ft)		
Aisle width (ft)		

4. Estimate how many greenhouse compartments your program will require concurrently.
   a. Current
   b. Future

4. Provide an annual schedule of your greenhouse activity. Estimate how long a typical experimental trial may be run in each compartment. What will be the normal plant turnover time?

	a. Current	b. Future
Sequence of growing activity		
Typical schedule year after year		
Multiple consecutive crops		
Inactive periods/seasons		
Total use period (month to month)		
Total Number of Plants		
Plant Turnover (No. of plants per time period)		
Other (Please Specify)		

5. Describe the cultivars used in your greenhouse activities and their cultural requirements. Please provide the general ranges used during your greenhouse activities.

		a. Current (N/A = not applicable)	b. Future (N/A = not applicable)
Cultivar(s)			
Max. Plant Height From Base of Pot to Top of Plant (ft)			
Pot	Type (plastic, clay, etc)		
	Size (H" x W")		

Beth Grafton-Cardwell Mike McKenry Themis Michailides

1	GH scope and objectives	greater # pest species for experiments	culturing nematodes, some large GH trials, striking cuttings	Plant Pathology studies/ inoculations of potted trees; determine effects of stresses on fungal disease incidence, severity, cultivar resistance
2	GH contrib to program	grow insects on plants for trials	need GH rearing prior to field studies	expand to GH/growth chamber coordinated controlled studies
3 GH space	floor growing area ASF	900	150-500	1000
	stationary benches ft	100	40	40
	rolling benches ft	40	40-80 (5' wide)	20
	floor growing width ft	40	0	6
	bench width	3, 4	6	6
	aisle width	3	3	2.5
4	# of compartments	10-12 place different species of plants and pests in different cmpts to reduce contamination	1	2 x ≥ 600 sq ft
5 GH schedule	sequence	Year-round	any time	spring-summer-fall
	year-year schedule	Year-round	varies	same
	multiple consecutive crops	Multiple and consecutive		pistachio, prunes, stone fruit, etc. (monoculture)
	inactive periods	none		winter
	total use period	Jan-Dec		March -thru- October
	total # plants	1200 plants or flats	200/trial	hundreds
	plant turnover	100+ flats in weeks 1000 pots in months		every 2 - 4 weeks, some reused over and over
	other			cycled with GC treatments

6 Cultivars and cultural requirements	cultivars	Pitosporum, citrus, cotton, beans	grapes, grasses, walnuts, clovers	pistachio, prunes, stone fruit, etc. (monoculture)
	max plt ht	4'	4' ??	8'
	pot composition	plastic	plastic, clay, sleeves	plastic pots, bags
	pot size	4", trays, 1 gal, 5 gal	varies	8" w x 14" h
	soil sterilization	yes	yes, before and after	yes
	soil media	pre-, UC, unique mixes	field, vermic., sand, peat, perlite	premix and own mix
	water type	Tap, Distilled for experiments		well water and low salt water
	irrigation method	Drip, mist	drip, mist, hose	drip
	day length	ambient to 12:12 to 16L:8D	ambient	normal
	shading (%)	varied, 50-70% with shade cloth	summer 50%	50%, auto shade cloth
	supplemental light (PAR)	Grow lights in winter	none	some type
	temp range day	70-85, varying by cmpts	85	75-85 +/- 5
	temp range night	70-85, varying by cmpts	70	55-65 +/- 5
	RH day	Controlled by cmpts varying from 40-70%	?	ambient (12 hours) to 95 +/- 2 to 100
	RH night	same	?	12:12, ambient 95 +/- 2 to 100
	ventilation (air exch/hr)	?	?	≥ 1 / minute (≥ 88 ft/min)
	min flooring composition	gravel	concrete or gravel	concrete
	other			

DPP

- ✧NARRATIVE DESCRIPTION OF NEED AND JUSTIFICATION
- ✧IDENTIFIED FOUR GREENHOUSE TYPES
  - ✧PROPAGATION
  - ✧RESEARCH GH W/MINIMUM EXCLUSION
  - ✧RESEARCH GH W/ EXCLUSION SPEC
  - ✧RESEARCH GH W/MAXIMUM LIGHT AND VENTILATION
- ✧IDENTIFIED HEADHOUSE NEEDS

RESEARCH GREENHOUSE WITH MINIMUM CONFINEMENT/EXCLUSION

Use Description:

These greenhouse modules will be used for programs that require some special greenhouse parameters to meet special cultural, equipment or compatibility issues. The greenhouses will be used to provide conditions suitable for:

- Activities that are compatible with other user in the same space
  - Growing plants between growth chamber treatments
  - Growing insects, nematodes or pathogens on plant hosts
  - Propagation
  - Seed germination
  - Rooting cuttings
  - Growing healthy and treated plants for transfer/transplant to labs, lathhouse, field, or another greenhouses.
  - Growing host plants

The contribution to the program will range from providing plants, insects, and pathogens for studies within and outside of the greenhouse. Some examples are:

- Plant improvement programs
- Breeding trials
- Seed germination trials
- Propagation technique trials for specific cultivars
- Cultivar comparison trials
- Grafting trials
- Propagation and hardening off prior to planting in the field
- Stock plant maintenance for research and education
- Providing seedlings with a known chemical history
- Entomology, nematology and pathology trials
- Pesticide efficacy, residue analysis, phytotoxicity trials

Space Type:	Concurrent shared use, RAC allocated and or scheduled
Compatibility:	
Internal:	Minimal or no impact
Adjacent:	Minimal or no impact
Space size:	Typically 500 to 1000 sf is acceptable
Environment:	
Winter:	Minimum nighttime 55ºF, 95% of time. Typical daytime 70ºF – 80ºF
Summer:	Maximum daytime 15 degrees below outside ambient. Typical daytime 80ºF – 90ºF (reduced efficiency at higher outside humidity)
Control:	Plus or minus 5 degrees
Humidity:	Controls capable of automating humidity
Light:	Work lights, altered daylength, extended season
Screening:	Whitefly size exclusion
Ventilation:	25 – 50 fpm fresh air
Hygiene:	May require special procedures
Pest Control:	May require special procedures
Services:	
Water:	Industrial, water with minimal chemical contaminates and salts, and standard fertilizer mix
Irrigation:	Hose and drip plus capability to add misting
Power:	Access to 110v GFI outlets Back-up power: none (if supplied with manual ridge vents)
Back-up	
Controls:	Automated, user adjustable for temperature and ventilation
Waste water:	May require sampling and/or treatment
Finishes:	
Floor:	Gravel or concrete OK
Equipment:	
Bench:	Movable, adjustable height to allow for short or tall plants, up to 5 gallon pots

RESEARCH GREENHOUSE WITH CONFINEMENT/EXCLUSION

Use Description:
These greenhouse modules will be used for programs that require greenhouse operation with special cultural, pest, plant, equipment or compatibility issues. These modules will probably require isolation from other users. The greenhouses will be used to provide conditions suitable for:

- Activities that require isolation from other users within the same modules
  - Propagation
  - Growing plants between growth chamber treatments
  - Growing insects, nematodes or pathogens on plant hosts

The contribution to the program will range from providing plants, insects, and pathogens for studies within and outside of the greenhouse. Some examples are:

- Plant improvement programs
- Propagation technique trials for specific cultivars
- Entomology, nematology and pathology trials

Space Type:	RAC allocated
Compatibility:	
Internal:	Use typically not compatible with other users
Adjacent:	May impact adjacent users. Special care or separation required
Space size:	Typically 400 to 700 sf is desirable
Environment:	
Winter:	Minimum nighttime 55ºF, 95% of time. Typical daytime 70ºF – 80ºF
Summer:	Maximum daytime 15 degrees below wet bulb ambient. Typical daytime 80ºF – 90ºF
Control:	Plus or minus 5 degrees
Humidity:	Controls capable of automating humidity
Light:	Work lights, altered daylength , extended season
Screening:	Thrip size exclusion
Ventilation:	25 – 50 fpm fresh air
Hygiene:	May require special procedures and entry vestibule
Pest Control:	May require special procedures

Services:	
Water:	Industrial, water with minimal chemical contaminates and salts, and standard fertilizer mix
Irrigation:	Hose and drip plus capability to add misting
Power:	Access to 110v GFI outlets
Back-up power:	Required to maintain temperature and ventilation
Controls:	Automated, user adjustable for temperature, ventilation, and humidity
Waste water:	May require sampling and/or treatment

Finishes:	
Floor:	concrete OK
Equipment:	
Bench:	Movable, adjustable height to allow for short or tall plants, up to 5 gallon pots
Headhouse use:	Soil, plants, seed, containers/pots, fertilizer, pesticides, and other supplies delivered and stored. Soils, plants and seeds prepared and transported to greenhouse. Soils, plants, pots, and other materials cleaned, sterilized, disposed and/or stored for reuse. Plant material, insects, nematodes and pathogens prepared for evaluation. Evaluation and analysis of samples. Greenhouse related activities in growth chambers.

PRELIMINARY DESIGN PROCESS

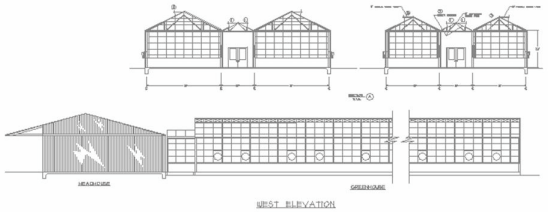
- ✧GREENHOUSE CONSULTANT
  - ✧TO CONSULT OR NOT TO CONSULT
- ✧TYPE OF STRUCTURE
  - ✧COMMERCIAL vs. INSTITUTIONAL vs. CUSTOM
  - ✧STEEL vs. ALUMINUM
  - ✧KNEE WALLS
  - ✧SHARED WALL vs. INDEPENDENT UNITS

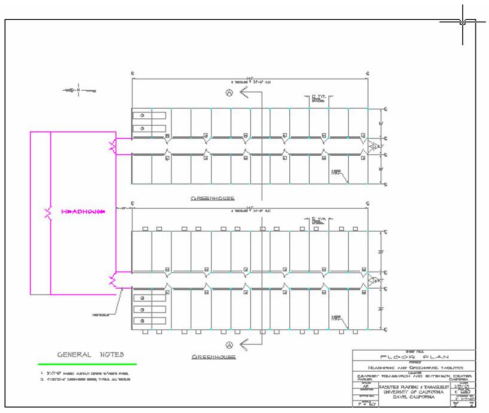
PRELIMINARY DESIGN PROCESS

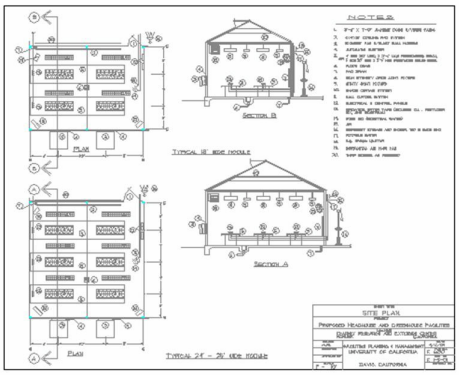
- ✧ GLASS vs. POLY
  - ✧ Light transmission
  - ✧ Replacement (life cycle cost) vs. First cost
  - ✧ Framed glass system
- ✧ INTERNAL CORRIDOR/INTAKE PLENUM
  - ✧ "plus" Hygiene and pest/contaminate control
  - ✧ "minus" Additional shading
- ✧ FAN/PAD vs. COOLERS vs. A/C
  - ✧ $
  - ✧ Cooling capacity, air velocity, uniformity
  - ✧ Negative vs. positive pressure

PRELIMINARY DESIGN PROCESS

- ✧SIZE OF MODULES
  - ✧How small is too small
  - ✧Size of module versus number of modules $
- ✧SPACE HEAT vs. RADIANT
- ✧D.I. WATER
- ✧FERTILIZER WATER

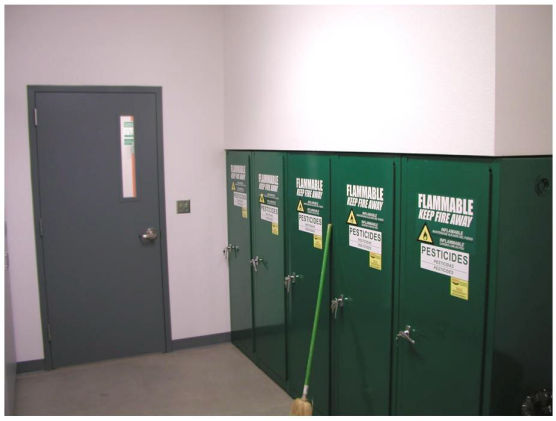






DESIGN & CONSTRUCTION DOCS

- ✧THE ARCHITECT
- ✧THE ARCHITECT'S TEAM
  - ✧ELECTRICAL
  - ✧MECHANICAL
- ✧GREENHOUSE MANUFACTURERS and CONTROLS PREQUALIFICATION
  - ✧Original spec. "or equal (no known equal)"
  - ✧Addendum #1 "or equal"



PROJECT DESCRIPTION

- 20,000 GROSS SQUARE FEET
- 12,000 SQUARE FEET OF GREENHOUSE
- 24 MODULES- 12@ 24'x25', 12@ 24'x18'
- TWO WINGS, INTERNAL CORRIDOR, SHARED WALLS
- FRAMED GLASS, FAN & PAD, SPACE HEAT
- 5,000 SQUARE FEET OF HEADHOUSE
- PRE-ENGR METAL BLD, TWO CLEAN LAB SPACES, ONE DIRTY PREP SPACE

PROJECT SCHEDULE

- 1994-95 PROJECT FIRST INCLUDED IN UC 5-YEAR CAPITAL PLAN
- SPRING, 2000 - SITE VISITS
- JULY 1, 2000 - PROJECT FUNDED
- SUMMER/FALL, 2000 - QUESTIONNAIRES
- NOV, 2000 - DPP FINALIZED
- JAN, 2002 - PRELIM DESIGN COMPLETED
- JUNE, 2002-BID DOCUMENTS COMPLETED
- NOV, 2002 - CONSTRUCTION STARTS
- DEC, 2003 - CONSTRUCTION COMPLETED

PERSIMMON PRUNIING & REJUVENATION

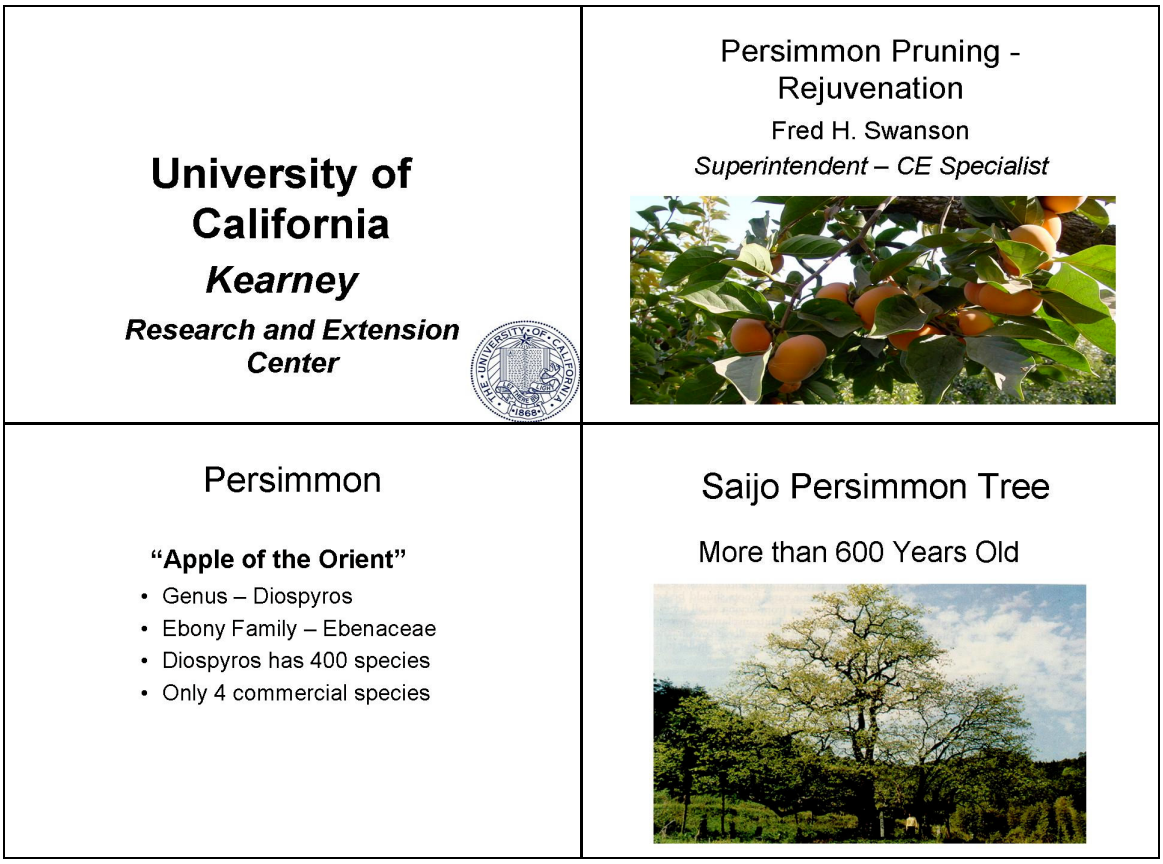
FRED SWANSON, SUPERINTENDENT
KEARNEY RESEARCH & EXTENSION CENTER
UNIVERSITY OF CALIFORNIA

Project cooperators: Kevin Day, Farm Advisor, UCCE Tulare County
Scott Johnson, Extension Pomologist, UC Davis
Chuck Boldwyn, Superintendent of Agriculture, KREC

Persimmons in California are classed as a minor specialty crop with the acreage totaling less than 2000 acres. Successful marketing requires a high quality product, which is closely related to fruit size. Older persimmon trees have greater difficulty than young trees in sizing their fruit. In addition, tree height in older orchards is frequently excessive with a canopy that shades out the lower fruitwood. This adds substantial labor costs to the production inputs due to the increased ladder work.

One objective of this study is to determine the optimum method of pruning for restoring the fruit sizing ability of an old persimmon orchard. Another is to determine the feasibility of creating a new fruiting zone lower in the tree thereby reducing labor inputs. The final objective is to evaluate the economic impact of the treatments and the potential for benefit to growers.

This study is entering its third year and the fruitwood regeneration is promising in the two treatments associated with heading cuts (scaffold removal above 6 feet). Tree height reduction and the creation of a new fruiting zone are quite apparent in the most severe pruning treatment. This study is expected to continue through 2005.

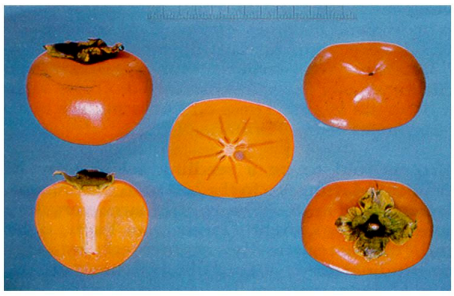


Japanese – Oriental Persimmon
D. Kaki

- Fruit tree 5th most important in Japan
- Japan – 30,000 hectares
- California < 2,000 acres
- Astringent and non-astringent types

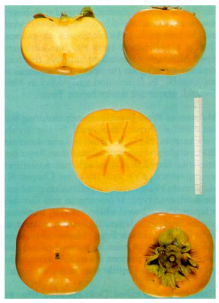
Astringent

Hachiya



Non-astringent

Jiro



Fuyu

Production and Marketing Issues

- Alternate bearing
- Fruit size is critical
- Not economical to thin
- Seasonal influences

KREC Orchard

- Orchard - 35 years old
- 2001 – non marketable sizes
- Fruitwood – all in the top
- High labor costs – ladder work

Research Questions

- Rejuvenate trees with heavy pruning?
- Reduce labor costs?
- Increase fruit sizes?
- Years to profitability?

Research Study Design

- 4 pruning treatments
- 5 replications
- Randomized complete block

Pruning Treatments

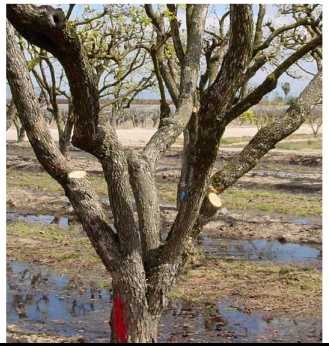
- Yellow – check
- Red – 50% limb removal cuts
- Blue – 50% heading cuts
- Green – 100% heading cuts

Yellow – 2002

March

Red - 2002

March



Blue – 2002

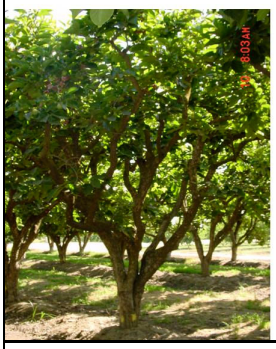
March

Green – 2002

March

Yellow – 2002

June

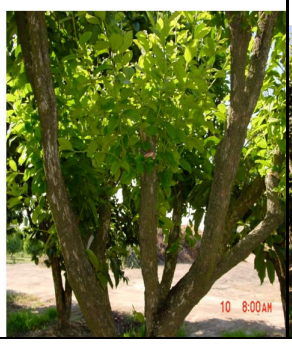


Red – 2002

June

Blue – 2002

June



Green – 2002

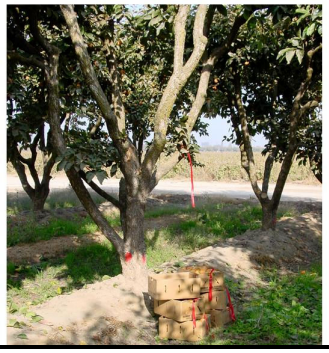
June

Yellow – 2002

November

Red – 2002

November



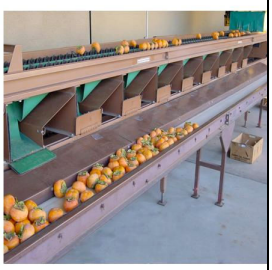
Green – 2002

November

Heavy Fruit Load

Balanced Fruit Load

Fruit Data Collection



Yellow – 2003

February

Red – 2003

February

Blue – 2003
February

Green – 2003
February

Green – 2003
February

Yellow – 2003
April

Red – 2003
April

Blue – 2003
April

Green – 2003
April

Blue – 2003
May

Green – 2003

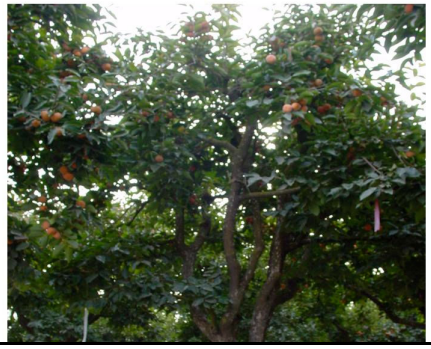
May

Green – 2003

May

Yellow – 2003

November



Red – 2003

November

Blue – 2003

November

Green – 2003

November

Harvesting – 2003

November

Harvesting – 2003

November

Fruit Data Collection

Green – 2004

January

Green – 2004

January

Pruning – 2004

January

Pruning – 2004

January

Summary

- NSD – yellow – red – blue treatments
- Improved fruitwood – blue and green
- Improved tree shape? – green
- Lower pruning - harvest cost? – green

Conclusions

- In Ag – $$ are always next year!!!!
- In Univ. – needs more research!!!!
- We have all learned a little more about persimmons

IAMFE

LEE CLARK, RESIDENT DIRECTOR
SAFFORD AG CENTER
UNIVERSITY OF ARIZONA

Latest update: 2-01-2004

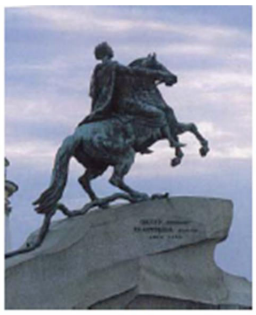
IAMFE/RUSSIA 2004

THE 12TH INTERNATIONAL CONFERENCE AND EXHIBITION ON MECHANIZATION OF FIELD EXPERIMENTS

5-9 July 2004

at

St. Petersburg State Agrarian University, St.Petersburg/Pushkin, Russia



St.Petersburg "Peter the Great"

Objectives of the Conference

- a. Give the participants an opportunity to study up-to-date field and laboratory machinery
- b. Present results regarding the progress of mechanization of field experiments
- c. Discuss and exchange experiences of handling field trials
- d. Stimulate co-operation and co-ordination of efforts regarding testing, construction and use of machinery, equipment and instruments intended for field and laboratory experiments
- e. Promote personal contacts between agronomists, plant breeders, agricultural engineers and others who are interested in mechanization and management of field experiments
- f. To hold a General Assembly of IAMFE to discuss the philosophy, etc.

Topics to be Presented

- Management of field experiments
- Design of trials
- Special requirements of planning and carrying out field research
- Field experiments and measurements in forestry research
- Collection and processing of field trials data
- Precision agriculture experimentation
- Soil cultivation, planting and fertilizing in trials
- Pesticide application, irrigation and weather data recording
- Root crops: Trial design, mechanization systems, crop monitoring and assessments
- Horticultural crops and glass houses
- Grass land experimentation

Other Learning Experiences

Visit

- NW Methodological Centre of Russian Academy of Agricultural Sciences
- Outdoor exhibition and demonstration of field equipment

Tours

- St. Petersburg
- Novgorod
- Pskov and Pushkin mountains
- Viborg and Preosersk
- Ladoga Lake
- Moscow

Lee's Tentative Agenda

• Leave Tucson	Friday, July 2
• Rest & Register	Sunday, July 4
• Attend Meetings	Mon-Fri, July 5-9
• Tour St. Petersburg	Saturday, July 10
• Rest & Attend Church	Sunday, July 11
• Tour Pskov/ Pushkin Mtns	Mon-Tue, July 12-13
• Travel to Moscow/tour	Wed-Sat, July 14-16
• Fly home from Moscow	Saturday, July 17

Tentative Costs

• Air Fare	$1200-$1800
• Registration	$ 235
• Hotel	$ 420
• Tours	$ 590
	$3035-$3635

PANEL DISCUSSION – THE IMPACT OF BUDGET REDUCTIONS ON THE FUTURE MISSION OF RESEARCH & EXTENSION CENTERS

FRED PERRY, UNIVERSITY OF CALIFORNIA
GARY LEMME, MICHIGAN STATE UNIVERSITY
COLIN KALTENBACH, UNIVERSITY OF ARIZONA

BUTCH WITHERS, MISSISSIPPI STATE UNIVERSITY

Research Center Administrator's Society
Winter Meeting, Phoenix, AZ

F. T. Withers Jr., Head
Central Mississippi Research & Extension Center

The Impact of Budget Reductions On the Mission of Research and Extension Centers
A Perspective of the Southern Region

February 2004

Budget Reductions

- Budget Reduction Period : 3-5 years
- Budget Reduction Range : 5% - 30%
- Affected Every State in Southern Region
- Historically Budget Reduction Recovery Cycle has been 6 years
- Impact from the Coverage of Mandated Costs
  - Salary Increases
  - Health Insurance

Major Impacts of Budget Reductions

- Major Organizational Restructuring
- Reduction in Research/Extension Personnel
- Reduction in Operational Support
- Redirection and Elimination of Research/Extension Programs
- Increased the Need for External Funding Support and Funding from New and Innovative Sources

Organizational Restructuring

- Merging of Departments and Discipline
- Extension Reorganization – State, Regional and County Levels
- Management of Multiple Experiment Stations
- Closing of Branch Stations and Research Units
  - Swine, Dairy, Sheep, Fruit Orchards, Etc.

Reduction in Research/Extension Personnel

- Extension – Most Severely Affected
- Early Retirement/Buy Out Programs
- Moderately Affected States Lost 100 - 150 positions
- Personnel Reduction = Expertise Void

Reduction in Operational Support

- Reduction in Funding For Research/Extension Scientists and Programs
- Equipment Maintenance and Replacement
- Facility Maintenance
- Closure of Units or Focus Redirection

Increase of Funding Support

- External Funding
  - Grants
  - MOA's
  - Leveraging Funds
- Federal and State Initiatives
- Sharing in Grant Funding/Cost Recovery from Grant
- Renting – Leasing – Sale of Land
- Multi-State Cooperation
- Increase Sale Fund Proceeds
- Contractual Agreements
  - Steer Grazing
  - Heifer Development
- Political Support

Prioritization, Redirection or Elimination of Research/Extension Programs

- Doing more with less!!!
- Closing of Research Station Units and Programs
  Sheep, Dairy, Swine, and Fruits and Vegetable
- Maintaining Support for Teaching Program
- Prioritizing Programs
- Multi-State Efforts in Research and Extension to Support Minor Program Needs
- Redirection of Programs to Non-Traditional Areas and Available Funding

The Future of Research & Extension Centers

- Programs and Management Will Continue to be Directed by the Type of Changes Implemented to Address the Current Loss of Financial Support.
  - Reduced Research and Extension Faculty
  - Continue to Prioritize and Redirect Research & Extension Program Efforts
  - Depend More on External Funding Support of Research Which Will Require More Basic Type Research
  - Development of Multi-State Cooperative Efforts to Address Research Needs and Enhanced Technology Transfer

Impact of Budget Reductions on the Future Mission of Research and Extension Centers

Gerald "Skip" Jubb
Associate Director, Va. Agric. Expt. Sta.
Virginia Tech

Research Center Administrators Society
February 3, 2004
Chandler, AZ

Crystal Ball

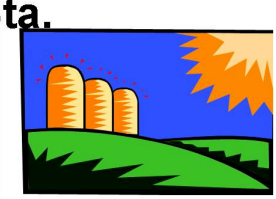
I'm looking to the future;

I've been scrying through the glass.

Seeking for the vision that I know will come to pass.
.....

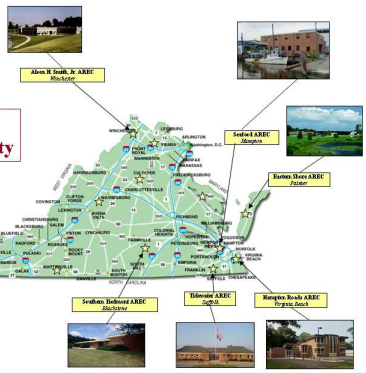
Mission of the Virginia Agric. Expt. Sta.

To perform basic and applied research on food and fiber systems, including their environmental consequences, plus natural and human resource issues relating to the future needs of Virginia, the nation, and the world.



http://www.vaes.vt.edu/

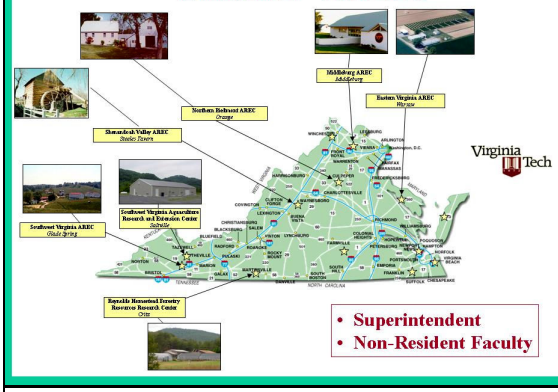
"Larger" ARECs



- Director
- Resident Faculty

Virginia Tech

"Smaller" ARECs



- Superintendent
- Non-Resident Faculty

Virginia Tech

Experiment Station - Funding Sources

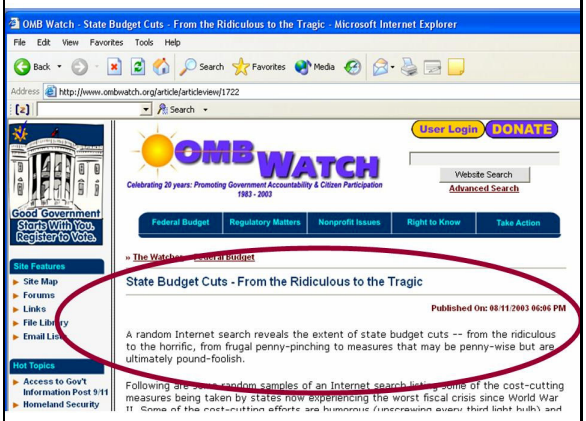
- State appropriations
- Grants and contracts
- Federal formula funds
- Product sales

Aug 21, 2002

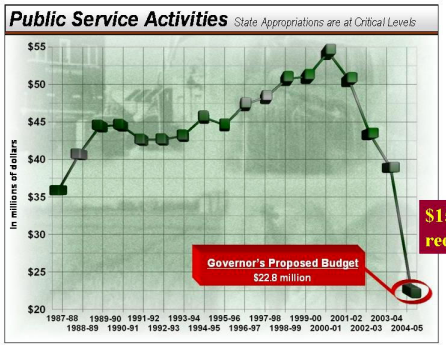
"State Budget Deficits – Huge and Growing"

- Current state deficits are deeper than they have been in the last 50 years.
- Deficits more severe than those of the early 1990s.
- Virtually all states have balanced budget requirements; must take strong actions to close deficits.
- State actions will likely cut basic services and/or impose new tax burdens.

Center on Budget and Policy Priorities – 12/23/02



South Carolina – Governor's Proposed Budget - Extension



$15.6M reduction

Budget Reduction Strategies
College of Agriculture & Life Sciences
Va. Agric. Expt. Sta. and Va. Coop. Ext.

- Reduce operating budgets
- Secure loans from Depts/ARECs in the College
- Implement faculty *Alternative Severance Option*
- Implement staff *Alternative Employee Designation*
- Hold positions vacant due to normal attrition
- Reduce or eliminate programs
- Consider restructuring - closing units

Virginia Tech

"The Numbers"
College of Agriculture & Life Sciences
Va. Agric. Expt. Sta. and Va. Coop. Ext.

FY02	Base Budget (state)	$51.7M
	3% reversion	$ 1.6M
FY03	7% cut (Round 1)	$ 3.7M
	12% cut (Round 2)	$ 5.6M
FY04	1% cut (Round 2)	$0.52M

Virginia Tech

Total loss – 23% of funds between May '02 – July '03

Personnel Losses
Alternative Severance Option – Faculty
Alternate Employee Designation - Staff

FY02 (Round 1) 110 persons
FY03 (Round 2) 105 persons

86 VCE agents
4 VCE other
55 Faculty
70 Staff

Virginia Tech

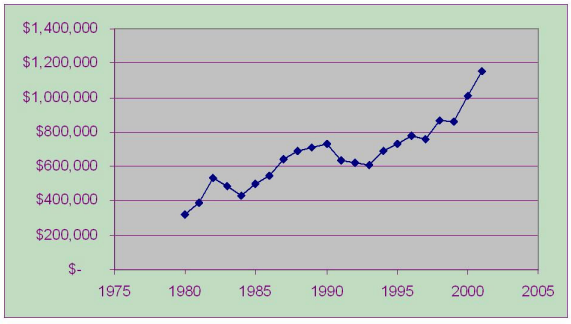
Personnel Losses
Eastern Shore AREC

FY02 (Round 1) 110 persons total
Two faculty:
Dr. Herman Hohlt, Dr. Sam Alexander
66 years of service

FY03 (Round 2) 105 persons total
Three staff:
Thomas Bailey, James Sample, and Carroll Savage
104 years of service

Virginia Tech

Alson H. Smith, Jr. AREC
Total Expenditures 1980-2003



How AREC Leaders Describe and Deal with their Predicament:

- Destructive
- Starvation Diet
- Stressful
- Stretched
- Stealing (robbing Peter to pay Paul)
- Creative
- Lucky
- Short-term fixes (band-aide approach)
- Reassignments
- Being exceedingly frugal

Research and Extension Centers
Visioning our Future Mission

- Maintain strength in production agriculture
- Invest in new areas
- Leverage funds
- Be innovative
- Focus on stakeholder needs
- Develop/enhance partnerships
- State funding is critical
- Enhancing faculty competitiveness
- Be an active participant

RCAS EXECUTIVE BOARD MEETING
September 28, 2003
HYATT REGENCY HOTEL
SACRAMENTO, CALIFORNIA

The Executive Committee of the Research Centers Administrator Society met in the Hyatt Regency Hotel, Sacramento, California on September 28, 2003. The meeting was called to order by President Bill Peterson. There were 23 members present. Each member introduced himself or herself. Sandy Maddox was recognized as the first female member of RCAS. Paul Sabesta made an announcement concerning the refrigerator in the rooms and the refreshment charges on the hotel bill. Paul also introduced Mike Connor, Superintendent of the Sierra Foothills Research and Extension Center. Mike welcomed the group to California and gave more detailed information on the upcoming tours as well as took care of some "housekeeping"chores.

President Peterson moved into the heart of the agenda with the committee reports. They were:

Secretary/Treasure Report by Denny Thompson.
Robert Dunker, Secretary, from Illinois was unable to attend.
Minutes from last meeting were not available but would be posted on the RCAS website.
45 member and 11 spouses were signed up for the Sacramento meeting.
Bank balance as of September 28, 2003 $11,771.72.
Meeting in Indiana/Illinois/Michigan netted $ 10.10
Meeting in Mobile generated $1,400.00.
Sacramento meeting appeared to be covered by registration fees.
Motion was made by John Hodges and Seconded by Allen Nipper that the Secretary/Treasure Report be accepted and was approved by voice vote of the membership.

Financial Committee/Cast Membership by Ed Hanlon.
Cast has 38 member societies
1 board member from each society, RCAS represented by Ed Hanlon.
The intent of CAST is to keep federal legislators and policy maker informed on agricultural issues

CAST also awards grants for agricultural leadership.

Awards Committee by John Hodges.
Announced the death of John A. Ewing, RCAS founder and former member who served as Director of the Tennessee Agricultural Experiment Station.
Distinguished Service award for 2004 had two nominees of which both are very deserving and proposed that there be a joint recognition of these two men: Carl Tart from North Carolina and Findlay Pate from Florida.
Motion was made by John Hodges and seconded by Paul Sebesta that Carl Tart and Findley Pate be given the 2004 Distinguished Service Award and was approved by voice vote of the membership.

Nominations Committee by Denny Thompson
Denny was presenting the report in the absence of Lyle Lomas, Chairman of the Nominating Committee.
The following were nominated as officers for the upcoming year by the committee:
Past President - Bill Peterson
President - Paul Sabesta
Vice President - Robert Dunker
Secretary - Randall Rawls
This slate of officers will be put before the membership for confirmation at the February meeting in Phoenix, Arizona.

President Peterson then brought up the meeting in Phoenix, Arizona on February 1- 4, 2004. He called on Dave Langston as local arrangements committee member to inform the group of the tentative agenda for the meeting. Dave gave the following information:

Intended format will be as usual at SAAS meetings. Gave out tentative agenda.
Discussed possible Wednesday tour to Yuma Arizona/El Centro California area.
Discussed "Windham by Request" at the hotel.
Passed around a sign-up sheet for golf Tee times for those interested.
Discussed the 3rd day tour as part of the program or having a separate fee for the different segments of the tour for the convenience of those not choosing to attend all segments.
Paul Sebesta stated that the time line for the Phoenix meeting would be the same as for SAAS meetings as for as deadlines for program submission, etc.
Butch Withers asked the question "Will we collect dues for SAAS at this meeting?" Following a group discussion on the subject, it was decided that there is no requirement for SAAS dues collection as long as we are not meeting with SAAS. The dates for RCAS winter 2004 and SAAS winter 2004 meetings were discussed. It was determined that the two did not coincide so that participation in each meeting would be possible for those choosing to do so.

Paul Sabesta, Program Chairman, conducted Program Planning for the February meeting. He gave the following web address as location for appropriate forms for submission of abstracts of papers for the meeting: http://DNAR.REC.UCDavis.edu/forms.
Tentative program agenda was presented for a full day Monday and Tuesday morning.
Group discussion of possible topics included:
Personnel topics such as workman compensation - Pete Shultz
Labor Unions - Fred Perry
Emergency preparedness, Bioterrorism Merritt Taylor
Niche marketing, Value added products Ray Cartee
Urban Agriculture - Ed Hanlon
Professional Development for Supervisory Staff - Butch Withers
Prison labor issues - Dave Langston
Agrotourism - Sandy Maddox
Specialty Equipment purchases - Mike Phillips

New business was the discussion of the summer 2004 meeting to be held in Bismark North Dakota. Paul Nyren, local arrangements committee, gave the following tentative schedule of events:
Dates to be September 12 - 15, 2004.
Executive Committee meeting will be on Sunday afternoon at the hotel in Bismark.
Monday tour will include stops at the National Wildlife Refuge water foul area and Central Grasslands Research and Extension Center.
Tuesday will include Lewis and Clark Center, area surface mine reclamation, and Native American Issues.
Wednesday will include the Bad Lands area of North Dakota.

With no other business brought before the group, President Peterson declared the meeting adjourned

Recorded by Randall Rawls
September 28, 2003

RESEARCH CENTER ADMINISTRATORS SOCIETY
EXECUTIVE BOARD MEETING
February 1, 2004
WYNDHAM CHANDLER-GARDEN HOTEL
CHANDLER, ARIZONA

The Executive Committee of the Research Centers Administrators Society met in the Wyndham Chandler-Garden Hotel, Chandler, Arizona on February 1, 2004. The meeting was called to order by President Bill Peterson at 2:00 PM. There were 35 members present. Each member introduced himself or herself. Bob Roth and Dave Langston welcomed the group to Arizona and presented information about the upcoming tour and about interesting sites and activities in the Phoenix area.

President Bill Peterson asked for committee reports as follows:
Secretary Bob Dunker distributed copies of the minutes from the Sacramento, California meeting held in September, 2003. Since Bob was unable to attend the meeting, appreciation was extended to Randall Rawls for recording and writing the minutes for distribution. A motion was made by Denny Thompson that the minutes be approved as written. This motion was seconded by Ray Cartee. Motion was approved by voice vote of the membership. Bob reported that 52 members, 15 spouses and eight speakers were registered for the meeting.

Denny Thompson, Executive Business Manager, presented the treasury report. Bank balance as of February 1, 2004 was $12, 320.89. Registration fees for the Sacramento meeting were $7,649. Expenses for the meeting were $5,520 leaving a net surplus of $2,126. Bob Roth presented the committee with estimated expenses for the Arizona meeting and that all costs appeared to be covered by registration fees. A motion to approve treasury report was made by John Hodges, seconded by Pete Schultz, and approved by voice vote of the membership.

Financial Committee report was presented by Ed Hanlon. Since RCAS has obtained its own FEIN number from the IRAS, Ed led a discussion of options that might be available to RCAS as it relates to its obligation for reporting to the IRS. The IRS will require our society to declare its status to determine how we will report our financial and society activities. It was unclear how our financial activities were being reported or accounted for under SAAS. President Bill Peterson suggested that a committee should be appointed to develop a recommendation to the Executive Committee on our options and status with the IRS. Denny Thompson will contact Jere McBride to get what financial records are appropriate. When the committee is appointed, chairman will work with SAAS Secretary/Treasurer to determine how RCAS activities have been reported in their financial reporting to the IRS.

Paul Sebesta, Program Chairman, presented a detailed report on this year's program and some background on speakers. President Peterson commended Paul on putting together a great program and looked forward to hearing all the presentations.

Awards Committee report was given by John Hodges. John reported that the awards committee had presented nominations at the Sacramento meeting for Distinguished Service Awards to be presented to Carl Tart from North Carolina and Findlay Pate from Florida. These nominations were approved by voice vote of the membership at the Sacramento meeting. These awards will be presented at the banquet on Tuesday evening.

Bill Peterson asked Paul Nyren to report on the September meeting in North Dakota. Highlights of Paul's report are as follows:

Sunday, September 12, 2004:
Meet at Doublewood Best Western, Bismarck, ND
1:00-4:00 PM Business Meeting

4:30-7:00 PM Pitch Fork Fondue at Fort Lincoln

Monday, September 13, 2004

7:30 AM Board buses for tour

Chase Lake National Refuge (possibility)
Carrington Research & Extension Center (Box lunch at Center)
Central Grasslands Research & Extension Center (Roast beef supper)

7:30 PM Return to Bismarck

Tuesday, September 14, 2004

Check out of hotel.

8:00 AM Board buses

Plant Materials Center, Bismarck
Lewis and Clark Interpretive Center (Box lunch)
Tour Falkirk coal mine
Indian Hills – Talk on effect of the Garison Dam on the native population
(Supper at Indian Hills)
Travel to 4-Bears Casino & Lodge (Overnight)

Wednesday, September 15, 2004

8:00 AM Talk on medicinal plants used by Native Americans
9:00 AM Travel to Little Missouri Badlands (Talk on geology)
2:00 PM Arrive back in Bismarck via Dickinson and other stops to view geology

There was some discussion by the committee that because of budget situations, it was difficult for them to get approval and attend two meeting a year. It was the consensus of the committee that the two meeting system was important and useful and that this type of arrangement should continue, but acknowledging that some members may not be able to participate during low budget years. RCAS will be meeting with SAAS convention in Little Rock in February, 2005.

An invitation from Walt Hitch, Tennessee, to come to Tennessee in the Fall of 2005. Ray Cartee moved that the Executive Committee accept this invitation. It was seconded by Mike Phillips and motion passed by voice vote of the committee.

The Executive Committee discussed options for future meetings. The RCAS will meet with SAAS in Little Rock, AK in the winter of 2005. There was interest in having a future winter meeting in south Texas. SAAS is scheduled to meet in Orlando, FL in winter 2006 and Mobile, AL in winter of 2007. Bill Peterson suggested that this item be discussed during the business meeting on Tuesday morning.

Lyle Lomas presented the Nomination Committee report. The nominations committee offered the following nominations for the upcoming year:

President: Paul Sebesta
Vice President: Robert Dunker
Secretary: Randall Rawls

President Peterson asked for any additional nominations, and hearing none, declared that these nominees would be brought forth to the membership at the business meeting for a vote on Tuesday.

Dennis Onks, Proceeding Editor, reported on the status of proceedings. Due to job change by Carl Tart, who has graciously printed past proceedings, there has been a delay in getting proceedings printed and distributed. Dennis reported that 2001-2002 proceeding will be merged into one publication and would be available in a few months. There are no plans, however, for printing the 2003 proceedings. Paul Sebesta suggested that for future meeting we might have authors provide a copy of their PowerPoint presentation and a one page written abstract. This format could still be printed if the society wished to do so, but could also be made available on the website or a CD. Paul stated that if he could get a copy of each speakers PowerPoint presentation, he

would put on a CD for distribution. President Peterson charged Paul to proceed with this project for the 2004 meeting.

There was general discussion on how we can best use our website and keep it updated. Jim Smith from Mississippi has been taking care of our site. Butch Withers reported that Elizabeth Cook who is the person who posts our information on the website has been ill and it has been difficult to post information as timely as in the past. There was discussion about whether the society should hire a professional service to do this, so it wouldn't be a burden on any one group. President Peterson said that he would contact Jim Smith to get his thoughts on this. The website has been a great resource for the society.

Bill Peterson asked Bob Roth and Dave Langston to provide an overview of the planned activities for the meeting.

Meeting was adjourned by President Peterson at 4:05 PM.

Recorded by Robert Dunker, Secretary
February 1, 2004

RESEARCH CENTER ADMINISTRATORS SOCIETY
BUSINESS MEETING
February 3, 2004
WYNDHAM CHANDLER-GARDEN HOTEL
CHANDLER, ARIZONA

The Research Centers Administrators Society held their annual business meeting in the Wyndham Chandler-Garden Hotel, Chandler, Arizona on February 3, 2004. The meeting was called to order by President Bill Peterson at 10:40 AM. There were 52 members present.

President Peterson offered his appreciation and thanks to Paul Sebesta, Program Chair, and Bob Roth and Dave Langston, Chairs of Local Arrangements. Thanks were also extended to Dan Warren who handled all the audio visual needs for the program.

Denny Thompson, Executive Business Manager, presented the treasury report. Bank balance as of February 1, 2004 was $12, 320.89. Registration fees for the Sacramento meeting were $7,649. Expenses for the meeting were $5,520 leaving a net surplus of $2,126. Denny said it appeared that all costs for this meeting were covered by registration fees with a little left over.

President Peterson opened the floor for discussion about upcoming meeting. He informed the membership that the consensus of the Executive Committee was to continue to meet twice a year. RCAS will be meeting with SAAS in Little Rock in 2005. An invitation to hold our Fall 2005 meeting in Tennessee was offered by Walt Hitch at the Executive Committee. Motion was made by Ray Cartee and seconded by Dan Hagillih that we accept this invitation and meet in Tennessee. Motion was approved by voice vote of the membership.

Bill informed the group that we needed to decide where we were going to meet in 2006. We must inform SAAS two years ahead if we are going to meet somewhere different than the SAAS convention. SAAS is planning to meet in Florida in 2006 and in Mobile in 2007. Motion was made by Chuck Reid, seconded by Harry Carlson that RCAS meet with SAAS in Florida in 2006. No further discussion was offered and motion was passed by voice vote of the membership. Motion was made by Paul Sebesta , seconded by Jim Beaty that RCAS meet in south Texas in 2007. Motion was passed by voice vote of the membership. Bill Peterson said he would take responsibility of notifying SAAS of our intentions.

Secretary Bob Dunker presented the membership with an idea for an electronic directory and membership resource on CD with concurrent information on our website. Membership directories would be distributed via CD instead of printed copy. Hard copies of the directory could be printed from text file also stored on the CD. Relevant society information and activities could be presented in electronic format and used to recruit new members and states. It is important to keep current with website and CD so information is not conflicting. CD version would be self extracting (auto-run) and presented graphically for easy use. Hot links to specific information would make CD look and act as web based information. Discussion from the group was supportive in progressing with this concept. In addition, members offered discussion about maintaining website and that it may be unreasonable to assume an institution do this forever. Dennis Onks recommended that since we have money in the treasury, we might want to look at a commercial web site service to design and maintain our site. President Peterson appointed the following committee to pursue the electronic directory and offer a recommendation at the North Dakota meeting. The committee is as follows: Robert Dunker, Chair, Ed Hanlon, Dennis Onks, and Paul Nyren.

Lyle Lomas, Chair of Nomination Committee offered the following names for elected office:

Paul Sebesta, President
Robert Dunker, Vice President
Randall Rawls, Secretary

Nominations were solicited from the floor. It was moved by Paul Nyren, seconded by Fred Swanson that nominations be closed and elect this slate of officers. Motion was approved by voice vote of the membership. President Peterson declared the Officer Slate as elected.

Paul Nyren briefed the membership on the upcoming Fall 2004 in North Dakota. Registration information will be forthcoming as it is available.

Butch Withers asked how we could get more states involved in becoming members. He suggested that as we develop our CD directory, that copies should be sent to every agricultural state and market ourselves to those who would benefit from what we have to offer. Chuck Reid volunteered to write a letter to North Central States to provide information about RCAS.

Meeting was adjourned by President Peterson at 11:45 AM

Recorded by Robert Dunker, Secretary
February 3, 2004

RESEARCH CENTER ADMINISTRATORS SOCIETY
BYLAWS

Article I
Name

The name of this organization shall be "Research Center Administrators Society" and for the purpose of this document shall be frequently referred to as "Society."

Article II
Objectives

The objectives of the Research Center Administrators Society shall be to hold educational meetings; to provide opportunities for interaction with colleagues; and to enhance the profession within the scientific community.

Article III
Members

Section 1

The membership shall include superintendents, resident directors, center directors, and other individuals with various titles having administrative responsibilities involving a field station, branch station, research station, research center, or other branch research facility of a state agricultural experiment station or any other public or private agricultural research organization.

Section 2

The membership shall be composed of regular and active members. Any unit head of a branch research facility in any participating state shall be considered a regular member and shall be eligible for active membership. Any individual, with administrative responsibilities involving a satellite research facility in any participating state who attends a meeting and pays the designated registration fees shall be considered an active member for three years with all rights and privileges afforded by the Society.

Article IV
Officers

Section 1

The officers of the Society shall be a President, a Vice-President, a Secretary, an Executive Business Manager, a Society Proceedings Editor, a Communications Officer, and a Newsletter Editor. These officers shall perform the duties prescribed by these bylaws and by the parliamentary authority adopted by the Society.

Section 2

The officers shall be elected by the membership to serve for one year or until their successors are elected, and their term of office shall begin at the close of the winter meeting at which they are elected. The Executive Business Manager**,** the Society Proceedings Editor, the Communications Officer, and the Newsletter Editor shall serve at the pleasure of the Executive Committee and the Society for a specified term announced upon the election of the officer. Additional terms may be served if deemed in the best interest of the Society.

Section 3

No member shall hold more than one office at a time, and no member shall be eligible to serve consecutive

terms in the same office. An officer may move into an office through the departure of another officer, completing the existing term and then be elected to serve a full term in that office. The Executive Business Manager, the Society Proceeding Editor, the Communications Officer, and the Newsletter Editor may serve more than one term upon recommendation of the Executive Committee and approval of the Society.

Section 4

Duties of the President shall include:

Serve as overall coordinator of Society activities;
Preside at all Society meetings.
Appoint Nominating Committee in accordance with Article VII, Section 1 of these bylaws;
Appoint Local Arrangements Committee Chair for the winter and summer meetings;
Appoint all other committees as needed.

Section 5

Duties of the Vice-President shall include:

Serve as Chair of the Program Committee;
Coordinate program costs with the Executive Business Officer in order to establish appropriate registration fees;
When meeting with the Southern Association of Agricultural Scientists (SAAS) provide a copy of the winter program to SAAS Secretary-Treasurer at the designated time if appropriate;
Mail copy of program to all Society officers and state representatives;
Provide Communications Officer with copy of program to place on the website;
Serve as member of the Executive Committee.

Section 6

Duties of the Secretary shall include:

Responsible for registration at all meetings and provide President and Executive Business Manager with final registration list;
Collect fees at all meetings and turn the monies over to the Executive Business Manager for deposit in the Society's bank account;
Prepare minutes of all winter and summer meeting business sessions;
Provide Communications Officer with unofficial copy of the minutes for each meeting for the website for membership review;
Provide the Proceedings Editor and Communications Officer with official approved copy of minutes for publication in the Proceedings and on the website;
Mail programs of all meetings and other appropriate information to membership;
Serve as a member of the Executive Committee;
Serve as recording secretary for Executive Committee meetings;
Maintain contact with SAAS Secretary-Treasurer throughout the year as appropriate.

Section 7

Duties of the Executive Business Manager shall include:
Maintain the Societies' banking accounts, fiscal records, prepare financial statements and provide such statements to the Executive Committee and the membership at the winter and summer meetings;

Issue checks for payment of invoices as submitted by the Executive Committee or program committee chair of any Society sponsored event;
Work with local arrangement committee in establishing appropriate registration fees for all meetings, to establish credit accounts, and other business matters related to any Society sponsored meeting;
Represent the Society when designated by the President;
Maintain current Membership List;
Revise as appropriate and maintain official copy of bylaws;
Provide Society Proceedings Editor with official copy of bylaws for publication in the Proceedings;
Maintain liaison with SAAS Secretary-Treasurer on matters relating to the business of SAAS and the Society;
Serve as a member Executive Committee;
Maintain past and current copies of Society Proceedings and provide copies to libraries, new members, and other individuals as requested;
Following the winter meeting, report new officers to SAAS Secretary-Treasurer and pay SAAS dues if appropriate;
Serve as a member of the Executive Committee.

Section 8

Duties of the Society Proceedings Editor shall include:
In association with the Vice-President, assemble all program presentations of the annual meeting and edit for publication;
Publish approved minutes of annual meeting and Executive Committee Meeting as provided by the secretary;
Procure all needed publishing materials and report cost to the Executive Committee for approval;
Serve as a member of the Executive Committee.

Section 9

Duties of the Communications Officer shall include:

Shall be responsible for maintaining the Society website.

Section 10

Duties of the Newsletter Editor shall include:
Shall be responsible for publishing and distribution of the Societies' newsletter;
Newsletter will be placed on the website at designated times as required by the Executive Committee;
Serve as a member of the Executive Committee;
Mechanism and dates of distribution of the newsletter to be determined by the Executive Committee**.**

Section 11

Duties of the Local Arrangements Representative:

A Local Arrangements Representative will be appointed for each of the winter and summer meetings;
The Representative will visit the meeting site in advance of the meeting to determine if the meeting room and other facilities assigned the Society are adequate;
Meet with hotel sales person or other appropriate businesses to make arrangements for the winter meeting including, coffee breaks, tour buses, banquet/or social visual aid equipment or other related needs;
Coordinate business arrangements with the Executive Business Manager to establish charge accounts if appropriate;
Coordinate budget matters with program chairman and Executive Business Officer to establish appropriate registration fees;
Coordinate all program arrangements and planned activities with other Program Committee members;

Shall have the option to solicit additional assistance from the membership as needed;
Attend the Executive Committee meeting prior to their assigned meeting.

Article V
Meetings
Section 1

The Executive Committee will recommend sites for the winter and summer meetings two years in advance. The winter meeting shall continue to be held in association with SAAS unless otherwise ordered by the Society. The Active members will approve Executive Committee site recommendations at the business meeting of the winter meeting. Nominations of potential winter and summer meeting locations will also be accepted from the membership during the business meeting.

Section 2

The President in conjunction with the Executive Committee can only call special interim meetings.

Section 3

Active members in attendance at any winter, summer, or special meeting shall constitute a quorum.

Article VI
Executive Committee

Section 1

The Executive Committee shall consist of current officers, the immediate past President, and one representative from each participating state.

Section 2

The Executive Committee shall have general supervision of the affairs of the Society between annual business meetings, make recommendations to the Society, and shall perform such other duties as are specified in these bylaws. The Committee shall be subject to the orders of the Society.

Section 3

State Representatives shall be selected by the membership of their respective states.

Section 4

The Executive Committee shall meet at least twice annually**.** A meeting will be held during each of the semi-annual meetings.

Article VII
Committees

Section 1

The President shall appoint a Nominating Committee consisting of three immediate past Presidents that are still active in the Society. The Nominating Committee shall be appointed during the annual meeting. It shall be the duty of this committee to nominate candidates for the offices to be filled except for the office of Executive Business Manager and Society Proceedings Editor, and a Communications Officer. The

Nominating Committee shall report during the business session of the annual meeting and prior to the election of officers. Before the election, additional nominations from the floor shall be permitted. An Executive Business Manager candidate and a Society Proceedings Editor, and Communications Officer candidate shall be selected by the Executive Committee prior to the annual meeting, and the appointment shall be recommended to the Society for approval. The Society membership may also make nominations from the floor.

Section 2

Special committees shall be appointed by the President as the Society or the Executive Committee shall from time to time deem necessary to carry on the work of the Society. The President shall be ex-officio member of all committees except the Nominating Committee.

Article VIII
Parliamentary Authority

The rules contained in the current edition of "Robert's Rules of Order Newly Revised" shall govern the Society in all cases to which they are applicable and in which they are not inconsistent with these Bylaws and any special rules of order the Society might adopt.

Article IX
Amendment of Bylaws

Section 1 - Amendment by Active Membership

The Bylaws can be amended by a two-thirds vote of the active membership during the business session of the annual meeting. Notice of the proposed change must be given to the Society President one week prior to the annual meeting. The notice shall include the full text of the amendment and the President will make such amendment available to the entire membership at least 24 hours prior to the winter business session.

Section 2 - Amendment by Executive Committee

In an emergency, the bylaws can be amended by action of the Executive Committee provided strict procedures are followed. A member proposing the amendment shall provide the Executive Committee Chair with the full text of the proposed change. The Chair shall distribute copies and/or place the full text on the website for committee members 45 days prior to the voting deadline. Voting may be by letter, telephone with confirming letter, or by roll call if taken during an Executive Committee meeting. State Representatives of the Executive Committee are to review the amendment with their respective delegation and cast one vote reflecting the delegation's view. A two-thirds vote of the Executive Committee members voting is required for adoption of an amendment. The Chair shall announce the voting results, and should the proposed amendment pass, the Business Manager shall revise the bylaws to include the amendment(s) and place the full text of the revision on the web site for review by the Society membership . Amendments to the bylaws are to be ratified by the active membership at the winter meeting.

Revision Dates:

Revised 10-01-85
Revised 02-05-88
Revised 02-06-92
Revised 01-29-95
Current Revision 2001

RCAS COMMITTEE ASSIGNMENTS 2003-2004

Local Arrangements (Phoenix, AZ)
Bob Roth, Arizona, Chairman
Dave Langston, Arizona

Awards
John Hodges, Tennessee, Chairman
Randall Rawls, Alabama
Dave Langston, Arizona

Nominations
Carl Tart, North Carolina, Chairman
Lyle Lomas Kansas
Bill Peterson, Kentucky

Membership and Internet Services
Ed Hanlon, Florida, Chairman
Ron Robbins, Louisiana
Mike Phillips, Arkansas
Merritt Taylor, Oklahoma
Jim Smith, Mississippi
Paul Sebesta, California
Ray Cartee, Utah

Proceedings
Dennis Onks, Tennessee, Chairman
Carl Tart, North Carolina
Merritt Taylor, Oklahoma

Finance
Denny Thompson, Executive Treasurer, North Carolina
Malcomb Pegues, Alabama
Jim Smith, Mississippi
Bob Roth, Arizona
Ed Hanlon, Florida

RCAS Expansion
Ray Cartee, Utah, Chairman
Paul Sebesta, California
Butch Withers, Mississippi
Findlay Pate, Florida
John Hodges, Tennessee
Lyle Lomas, Kansas
Carl Tart, North Carolina
Jim Pitts, Alabama
Chuck Reid, Michigan
Paul Nyren, North Dakota
Jim Beaty, Indiana
Robert Dunker, Illinois

2004 DISTINGUISHED SERVICE AWARD RECIPIENT

DR. FINDLAY M. PATE
Center Director
Ona Range Cattle Research Center
Ona, Florida

Dr. Pate is the first of two members recognized this year by the RCAS membership for distinguished service and support of the Society's mission to improve the administration of agricultural research units. This award has been earned by service as a member and committee chair during his membership for the past 19 years. During this period he has served on the By-laws, nominations, finance, local arrangements, awards and program committees. He has served in all officers positions being 2nd Vice-President in 1995, lst Vice-President in 1996 and President, 1998-1999.

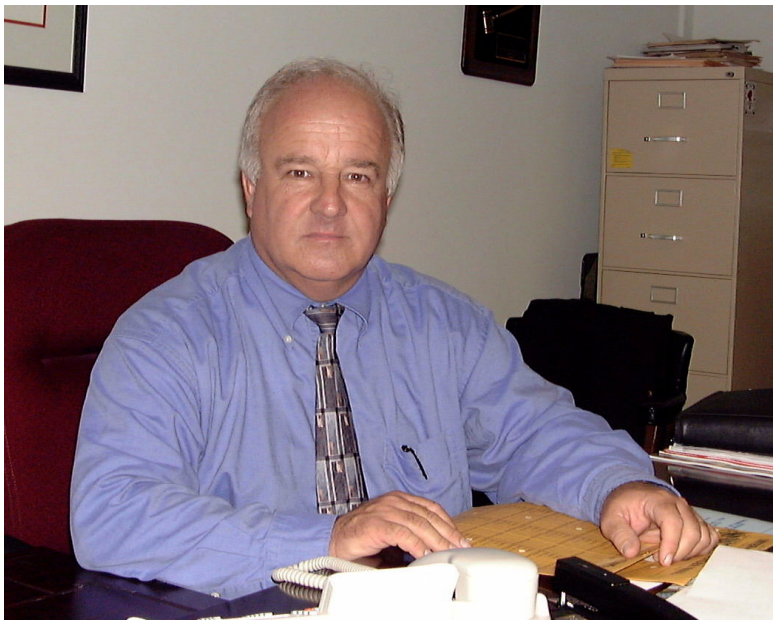
Raised on family cattle farm in Georgia. Attended Abraham Baldwin Agricultural College, University of Georgia (BS 1965), Oregon State University (MS 1967), and again the University of Georgia (PhD 1970). Professional employment entirely with University of Florida, at the Everglades REC, 1970-1983, and Director of the Range Cattle REC , 1983-present.

Research on utilizing sugarcane by-products with emphasis on developing value added molasses-based liquid feeds. Worked with cow-calf management systems on improved pasture and native range. Studied calf management at weaning, mineral nutrition, feedlot waste disposal, best management practices, pasture fertilization, parasite control, and forage evaluation.

Participated on two research/extension team projects that impacted Florida beef production. One was the development of value-added liquid feed supplements for grazing cattle, defining the importance of natural protein and fat in liquid feeds. A second resulted in new fertilizer recommendations for bahiagrass pasture that excluded phosphorus and potassium, saving Florida cattlemen millions of dollars annually and reduce phosphorus contamination in water.

Authored 150 scientific articles, 52 Florida Cattleman and Livestock Journal articles, 95 farmer and rancher articles, and 42 miscellaneous publications. Member American Society Animal Science, Florida Cattlemen' Association, Alpha Zeta, Phi Kappa Phi, Gamma Sigma Delta, and Sigma Xi. Top five percent of Junior and Senior Class, University of Georgia 1964 and 1965, respectively. Gamma Sigma Delta Award, Senior with highest academic average, College of Agriculture, University of Georgia, 1965. Outstanding Senior in Department of Animal Science, University of Georgia, 1965. Recipient of University of Florida, IFAS Extension Team Award 1999. Florida Cattlemen's Association, Researcher of the Year 2002, Florida Association County Agricultural Agents, Extension Specialist Award, 2003.

2004 DISTINGUISHED SERVICE AWARD RECIPIENT



CARL V. TART, JR.
Assistant Commissioner
NC Department of Agriculture
and Consumer Services
Raleigh, North Carolina

Mr. Carl V. Tart, Jr. is recognized this year by the RCAS membership for his distinguished service and support of the Society's mission of improving the administration of the represented agricultural research units. Mr. Tart has served in numerous capacities within the organization and has been instrumental in the evolution and development of the outstanding organization the RCAS has become. This award recognizes Carl's contributions, which have not only resulted in significant savings to the organization, but his efforts have also resulted in significant growth in membership and participation. He has been instrumental in assisting with program development and the acquisition of superior speakers to continue improving the quality of information transfer for meeting attendees. Professional improvement has been and remains a priority to which Carl is devoted.

Carl began active participation with the Society with his membership in 1985. During his 19 years of service, he has held numerous offices in RCAS and has served on 10 different committees.

Carl is a native North Carolinian growing up in Zebulon, NC. He attended NC State University earning his BS and MS degrees in Agricultural Education. Upon graduation, he followed in his father's footsteps and began his career in Vocational Education as instructor in the Durham County school system. After 6 years, he accepted a position as the Assistant Director for the Division of Research Stations with NCDA&CS beginning in 1979 and served in this capacity until 1998 when he was appointed Director of the Division. Carl excelled in this role and due to his contribution to the Division and the Department was promoted in 2003 to his present position as Assistant Commissioner of the Department of Agriculture.

Carl is an individual of energy and this is reflected in his professional and personal life. He additionally remains a faithful alumni of the Wolfpack and enjoys an unprecedented relationship with the university in his new role. He has instilled all of this energy and commitment to RCAS over the years resulting in a dedication and level of participation that is unmatched. His receipt of this award recognizes and supports his efforts.

PAST RECIPIENTS OF THE DISTINGUISHED SERVICE AWARD for service, leadership, and outstanding contributions to RCAS over an extended period of time.

YEAR AWARDED	RECIPIENT
1987	John Ewing
1988	Robert "Bobby" Moss
1989	Joe High, Jr.
1990	Wallace Griffey & Bill Webb
1991	Norman Justus
1992	Gene Morrison & Jere McBride
1993	William Loe & Howard Malstrom
1994	James Riley Hill
1995	Edward Worley
1996	Robert Freeland & Will Waters
1997	Joe Musick
1998	Dennis Onks
1999	John “Ike” Sewell
2000	F.T. “Butch” Withers, Jr.
2001	Joe McFarland
2002	John Hodges III & John Robinson
2003	Ben Kittrell & Jim Jones
2004	Findlay Pate & Carl Tart

PAST PRESIDENTS, RCAS

YEAR	PRESIDENT
1969 – 1970	Robert Moss
1970 – 1971	Preston Reed
1971 – 1972	Charles Douglas
1972 – 1973	Charles Douglas
1973 – 1974	D. M. Gossett
1974 – 1975	Henry Marshall
1975 – 1976	Tom Corley
1976 – 1977	H. Rouse Caffey
1977 – 1978	E. G. Morrison
1978 – 1979	Robert Moss
1979 – 1980	Joe High, Jr.
1980 – 1981	Julian Craigmiles
1981 – 1982	Freddy Peterson
1982 – 1983	Wallace Griffey
1983 – 1984	Bill Webb
1984 – 1985	Gary Elmstrom
1985 – 1986	Norman Justus
1986 – 1987	Robert Freeland
1987 – 1988	Jere McBride
1988 – 1989	Howard Malstrom
1989 – 1990	Bill Loe
1990 – 1991	Edward Worley
1991 – 1992	Will Waters
1992 – 1993	James R. Hill, Jr.
1993 – 1994	Joe Musick
1994 – 1995	Dennis Onks
1995 – 1996	Jim Pitts
1996 – 1997	F. T.(Butch)Withers
1997 – 1998	Ben Kittrell
1998 – 1999	Findlay Pate
1999 – 2000	John Robinson
2000 - 2001	Denny Thompson
2001 - 2002	Carl Tart
2002 - 2003	Lyle Lomas
2003 - 2004	Bill Peterson