

Appendix A

University of Arizona Water Resources Research Center (WRRC)

2021 STRATEGIC PLAN

Submitted May 18, 2012 to University of Arizona College of Agriculture and Life Sciences

and

2012 Objective Metrics Report Showing Progress Toward Goals Outlined in

University of Arizona Water Resources Research Center (WRRC)

2021 STRATEGIC PLAN



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WRRC Purpose: To provide high-quality applied research, education, and outreach to improve water management and policy in water-stressed regions.

WRRC 2021 Vision: By 2021, our expanded applied research programs, increased engagement at the local, state, and broader levels, including international, and continued excellence of educational and outreach programs will cement our position as *the* leader in Arizona in applied water management and policy analysis.

WRRC Mission:

The WRRC promotes understanding of critical state and regional water management and policy issues through applied research, community outreach and public education.

To realize our planned 2021 vision, the WRRC is committed to:

- Building research programs that address issues of critical importance locally, regionally, and internationally, including those related to meeting the water needs of water-stressed regions with growing populations and economies.
- Maintaining excellence in water education; continuing to offer highly effective teacher education programs, K-16 water engagement, and graduate student training that grow and adapt to changing technologies and needs.
- Fully supporting the educational goals of Arizona Project Wet (APW) to develop the capacity within the K-12 school system to graduate creative and critical thinkers with the knowledge to manage local and regional natural resources and the ability to solve problems related to an interconnected, shared resource.
- Assisting local, regional, and international communities in water management and policy by continuing to foster strong, synergistic relationships with external and internal partners and stakeholders; develop new relationships and protect our reputation as a reliable and trustworthy partner.

WRRC Shared Values:

- An undiluted focus on water
- Improving water literacy within and beyond Arizona
- Sustainable water supplies for all water users, including the environment
- Supporting the resolution of real-world water challenges
- Independence, integrity, and quality
- Strong stakeholder relationships, partnerships
- Effective communication and outreach
- Innovative learning, teaching, and experiential instruction that develops creative and critical thinking skills and offers experiences outside the traditional classroom
- Paying it forward: students applying knowledge and teaching others; students becoming tomorrow's environmental leaders
- Effective professional development of K-12 teachers

STRATEGIC GOAL ONE: To increase WRRC capacity to engage in water policy and management research that is highly relevant to the real world through increased external funding and support and recruitment of skilled faculty and staff.

Current situation and gap between current situation and desired situation.

2011: External funding of \$513,000; 3 in-house faculty; 7 permanent staff

2012-2021: Increase in external funds will support additional staff positions to expand and strengthen research programs; increased numbers of affiliated faculty will enhance expertise in current water issues; visiting faculty on sabbatical will be housed at WRRC

Strategy/ies to achieve goal.

- Continue strong focus on research programs that address issues of critical importance locally, regionally, and internationally, including those related to meeting the water needs of water-stressed regions with growing populations and economies
- Continue to leverage WSP/WEES funding to coordinate a strategic investment in water sustainability
- Actively participate in campus groups (e.g., UA Food Safety Consortium and efforts focused on Mexico and the Americas) to strengthen capacity for collaborative research and team grant-writing
- Utilize participation in professional and academic organizations to stay abreast of current funding opportunities and emerging issues in water management and policy
- Continue using strong stakeholder relationships to facilitate, plan, and implement research
- Maintain our federally authorized statewide role as a funding source through management of the USGS 104b and 104g programs.
- Leverage WRRC expertise in stakeholder engagement, outreach, and policy analysis to strengthen positioning for funding by agencies requesting documented outreach on research projects (NSF, NOAA, USDA, Bureau of Reclamation)
- Enhance recognition that WRRC represents critical value added for University and non-University partners

Actions.

- Provide a home for visiting faculty on sabbatical whose interests mesh with those of WRRC programs (FY 2013-2021)
- Increase number of affiliated faculty through partnerships developed with research units across campus (FY 2013-2021)
- Target grant funding to continue recruitment of capable early- and mid-career professionals and talented graduate and undergraduate students (FY 2013-2021)
- Target proposals to issues of emerging concern, including agricultural water management (including food safety), water resource management for climate variability and change, environmental water needs, and international research projects that will increase external funding by 30% by 2017 and 90% by 2021, with focus on grants that pay full IDC (FY 2013-2021)
- Expand the WRRC's leadership through WSP/WEES to facilitate cross-departmental research, seed grant project collaboration, equipment purchase, student fellowships and travel grants, and support for meetings and invited speakers (FY 2013-2016)

Inputs needed to achieve the goal.

- Shared vision among WRRRC faculty, WRRRC-affiliated faculty, staff, and students
- Administrative assistance
- Additional professional staff, funded through grant income

Objective metrics that will be used to track progress towards attaining goal.

- Amount of grant funding received per year
- Number of faculty, visiting faculty, affiliated faculty, staff and students
- Number of projects funded on grants
- Indirect Costs (administrative and overhead costs) received by WRRRC and CALS

STRATEGIC GOAL TWO: To increase recognition, both within and beyond the University, of the WRRRC as an excellent provider of skills and knowledge for future generations of water professionals.**Current situation and gap between current situation and desired situation.**

2011: 3 WRRRC faculty performing teaching and student advising; support of students from Geography, Hydrology, Planning, SWES, Arid Lands Resource Sciences GIDP, and Law

2012: Implement data gathering to fully document students benefitting from WRRRC programs each year

2012-2021: Increase educational impact through visiting faculty as guest lecturers; increase affiliated faculty to heighten exposure of WRRRC programs in academic units across campus

Strategy/ies to achieve goal.

- Continue to support WRRRC programs that encourage involvement of graduate and undergraduate students
- Continue to offer formal class instruction that is integrally connected to the WRRRC Mission (e.g., Arizona Water Policy course) and related to UA certificate (e.g., Water Policy Certificate) and degree programs (e.g., M.S. in Water, Society and Policy)
- Utilize WRRRC outreach materials to publicize the many industry and academic honors awarded to WRRRC student assistants
- Participate in campus events targeting environmental programs

Actions.

- Seek graduate and undergraduate student support on grant applications (FY 2012-2021)
- Strengthen mentoring relationships between students and WRRRC faculty and staff using in-house mentorship training program (FY 2014-2021)
- Encourage visiting faculty to offer seminars focused on current water management issues (FY 2013-2021)
- Begin email follow-up to all WRRRC student alumni, to collect information on WRRRC experience and on employment following graduation (FY 2012-2021)
- Implement in-house tracking program to collect student contact data from all WRRRC activities (FY 2012-2021)

Inputs needed to achieve the goal.

- Shared vision among WRRRC faculty, staff, and students
- Student administrative support (0.25 FTE to solicit and gather student data)
- Cooperation of WRRRC student alumni

Objective metrics that will be used to track progress towards attaining goal.

- Number of undergraduate and graduate-level students mentored through WRRRC programs
- Number of student committees (internal and external to CALS and UA) supported by WRRRC faculty
- Number of students taught through formal instruction of classes; number of students attending guest lectures by WRRRC faculty at UA and other universities

STRATEGIC GOAL THREE: Through the activities of Arizona Project WET, support teacher professional development, offer real-world learning experiences for K-12 students, and train community and business members to facilitate student learning.

Current situation and gap between current situation and desired situation.

2011: APW offers novel teacher development, real world experiences for students, and business involvement in education to promote college and career ready graduates who can think critically and creatively

2012-2021: APW will update and continue offering unique learning to programs to the next generation of K-12 students and teachers

Strategy/ies to achieve goal.

- Develop and deliver programs that integrate science and mathematics seamlessly and offer real-world experiences that enable students to think through complex issues
- Deliver effective teacher professional development that models best instructional practices and features embedded assessment opportunities to gauge learning
- Offer relevant field studies that target exploration and discovery as well as opportunities for students to communicate learning and take action in their lives and communities

Actions.

- Design instructional strategies that have students thinking critically and creatively about relevant natural and human resource issues, and train team members (FY 2012-2013)
- Modify project based learning modules based on realized success and lessons learned and build new teaching modules to maintain student interest (FY 2013-2014)
- Develop online learning platform to employ technology more tangibly (FY 2013-2014)
- Build capacity with teachers at schools where instructional strategies have taken hold (annually)
- Interest new businesses and community members; train adults to facilitate student learning (annually)
- Conduct formative and summative assessment of all program components (annually)
- Save millions of gallons of water through applied student learning that produces action (annually)
- Maintain statewide infrastructure with personnel, resources and equipment in 4 counties (annually)

Inputs needed to achieve the goal (fundraising is ongoing).

- Annual support for one Faculty Director (\$100,000), one Program Coordinator (\$60,000) and two half time Community Coordinators (\$24,000) for every 20 teachers and 2000 students
- Annual cost of field experiences for 2000 students: \$20,000
- Annual cost of symposia for 1000 students: \$20,000
- Resources, books and equipment: \$60,000
- Online learning platform development: \$100,000

Objective metrics that will be used to track progress towards attaining goal.

- Pre- and post-learning module teacher surveys and self-reporting
- Pre- post-learning module student surveys on confidence using science and engineering practices and thinking critically
- APW and teacher-developed rubrics to assess progress
- Observation forms to assess students synthesis of understanding and communication skills
- Evidence (e.g., notebooks) of student achievement

STRATEGIC GOAL FOUR: To enhance WRRC leadership in the dissemination of sound and independent water management and policy information and research results through increasing communication with a broad network of professional contacts around the State and beyond.**Current situation and gap between current situation and desired situation.**

2011: registration to our Annual Conference, Brown Bag seminar attendees, and subscribers to publication mailing lists total ~3,500 people yearly

2021: WRRC programs reaching 5,000 people worldwide each year.

Strategy/ies to achieve goal.

- Increase visibility of WRRC outreach materials relied upon by our core constituency
- Target the use of media contacts and the new WRRC website to spread the message of our work
- Recognizing that WRRC faculty cannot accept all invitations to speak, encourage and train staff and students to engage in speaking and outreach opportunities
- Continue aggressive statewide outreach in coordination with Arizona Cooperative Extension to increase recognition of WRRC's leadership in documentation of statewide environmental water needs
- Develop and implement a marketing plan with partners to ensure most effective delivery of WRRC message to stakeholders
- Work to establish high-visibility "branding" of WRRC products

Actions.

- Create a regular WRRC press release and university-wide email to highlight faculty, staff, and student accomplishments (FY 2012-2021)
- Enhance metrics collection system to gather additional data on attendance at outreach events (FY 2013) and gather yearly data (FY 2013-2021)

- Develop a marketing plan to enhance delivery of WRRRC message using electronic media (FY 2013); implement plan (FY 2013-2021); establish video streaming of WRRRC events (2014)
- Incentivize outreach collaboration in Annual Performance Review of faculty and staff (FY 2014-2021)

Inputs needed to achieve the goal.

- Support for Marketing Graduate student to aid in plan development (\$5,000)
- Student assistance to track metrics and support promotion activities (each semester, @ \$3,000 per semester)
- Administrative assistance

Objective metrics that will be used to track progress towards attaining goal.

- Number of Brown Bag seminars
- Number of Annual Conference registrations
- Number of presentations, WRRRC staff, estimates of audience attendance
- Number of media contacts
- Number of subscribers to WRRRC regular publications

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Goal 1

- Amount of grant funding received per year
 - Federal Grants and Contracts: \$462,806
 - State Grants and Contracts: \$78,816
 - Foundation Funds: \$177,463
 - Private Grants and Contracts: \$300,675
- Number of faculty, visiting faculty, affiliated faculty, staff and student workers
 - Faculty: 4 (1 emeritus)
 - Staff: 10.75 FTE
 - Students: 34
- Number of projects funded on grants
 - 6 New in 2011 (extending in to 2012): \$457,757
 - 6 New in 2012: \$592,632
- Indirect Costs received by WRRRC and CALS
 - Total \$50,170
 - UA \$32,160
 - CALS \$12,864
 - WRRRC \$5,146

Goal 2

- Number of undergraduate and graduate-level students mentored through WRRC programs
 - Graduate Students: 14
 - Undergraduate Students: 8
 - Project WET: 12
- Number of student committees (internal and external to CALS and UA) supported by WRRC faculty
 - Master's Student Committees: 9
 - Ph.D. Committees: 8
- Number of students taught through formal instruction of classes; number of students attending guest lectures by WRRC faculty at UA and other universities and schools
 - Formal instruction: 12
 - Guest lectures (11): total students, 750

Goal 3

Note: Objective metrics for Goal 3 were modified in June 2013 to enable effective yearly tracking.

- Number of teachers participating in 7 hours or more of professional development: 366
- Number of teachers with an over 90% positive response rate on post-learning teacher surveys: 100% or 366
- Number of students instructed annually by those participating teachers: 23,400
- Number of students engaged in 1-hour or more of direct student outreach: 21,432
- Projected water savings resulting from student application of knowledge: 18,973,169 gallons

Goal 4

- Number of Brown Bag seminars: 22
- Number of Annual Conference registrations: 334
- Number of presentations, WRRC staff, estimates of audience attendance
 - Local (Tucson) Presentations (11), Attendance: 760
 - State (Within-Arizona) Presentations (33), Attendance: 921
 - National Presentations (12), Attendance: 575
 - International Presentations (16), Attendance: 2,530
- Number of media contacts
 - Radio: 3
 - Print: 8 (local and regional news outlets: stories in print)
 - Video: 5
- Number of subscribers to WRRC regular publications (AWR and Arroyo)
 - UA: 212
 - State and National: 1,802
 - International: 12
 - Online: 1,097