One Thing That Should be Done: Natural Resources Management—Water

Teaching

- Use *The Big Thirst* as a first-year common reading model for integrating the topic across multiple disciplines & across the campus

Overall NRM Teaching One Thing to do

- Rather than creating new courses to address these issues – take existing material and better integrate across disciplines
- Teaching and integrating the globalization of the critical issues into multiple disciplines
- Develop and offer cross-institution courses. Regional course-sharing to increase workforce development in mission-critical areas.
- Better teach and integrate soft skills:
    - Leadership
    - Conflict management
    - Policy analysis
    - Problem-solving
    - Teamwork
    - Communication
- Integrate the critical issues into K-12 programs (e.g., Ag in the classroom, summer Ag. institute)
- Develop internship consortium with extension and experiment stations across the western region
- Two-way communication with local, state, and federal agencies and other organizations/employers in developing workforce guidelines
- Enhance critical-thinking and problem-solving of regional issues by supporting students' participation in international experiences.

- Comments:
    - Online degrees, noncredit, badging
    - Extension offers local venues for practical instruction/internships
    - Extension faculty can instruct (when not in conflict with federal constraints)
    - Add "community development" to the soft skills list
    - Remember audience at the system; remind decision makers of region/institutions
-

Research

- Collect base-line data on effects of production practices (e.g., on nitrates)
- Improve coordination of research on water use
- Change consumer perspective on esthetics—e.g., use for cosmetic land water use
- Research on snow pack assessment and impacts on downstream stream use
- Research ways to incentivize water conservation
- Revisit the water law
- Assess water needed for food production
- Greater focus on reclamation and use of reclaimed water (II)
- Impact of climate change (II)

- Model consequences of a free market on water
- Create water markets based on ecological system services provided by ag
- Major research on plants that don't use much water, e.g., assess genomic audit of ability
- Research reclamation of water use for biomass production
- Need to start full-cycle analysis capacity
- Research precision irrigation capacity (sensor systems, computational and engineering ability to implement precision irrigation technology, determine which of these are region-wide or different (II)
- Develop ability to assess integrated water plan for economic evaluation of the water
- Make price a real reflection of scarcity
- Economic impacts of various water quality rules
- Research difference between green water (water in plant tissues) and blue water (water we can see); intersects with policy plus market research

Research: Overarching policies that affect more effective management approaches

- Economic analysis
- Endangered Species Act
- Water use-it-or-lose-it laws
- Full life-cycle accounting
- Water laws can be disincentives
- Public lands management—is it consistent? Effective?
- Farm Bill Policy does not allow some good management choices
- For invasive species—quarantine policies

Research Room Idea Board from Walk-About

- Develop internships and/or youth development (young scholars) with academic programs, AES, and CES through county offices
- Graduate fellowships at experiment stations and county extension offices
- Coordinate cross-institutional course offerings
- Recruit K-12 outreach programs at experiments stations and CES through 4H programs
- Coordinate with community colleges at experiment stations and cooperative extension

Extension

- Multi-disciplinary approaches to weather risks
- Research and education on crops that need less water
- Best Management Practices-->east accesses via web, mobile devices, etc.**
- Education and models for water efficient landscaping and plant development
- End user education on private water contamination
- Regional consortium on water issues to put more resources to water institutes
- Create market-based approaches to water use
- Integrate indigenous knowledge into technology
- Resolve legal issues regarding agricultural water use
- Education for producers to increase efficiency of livestock watering

** Denotes highest priority actions to be taken, based on dot-voting by group.

Alaska

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Competing uses of water	1. Not much except some research on 2. relationship between climate change 3. (i.e. warmer) Nothing 4. 5.	1. Really more a policy question than research 2. question, but need to figure out ways to make sure ag doesn't lose out on water. 3. 4. 5.
Critical Issue *b*: Water quantity/strategies to ↑ availability	1. Not much except some research on 2. relationship between climate change (Warmer & drier) on impacts on 3. ecosystems, esp. forests 4. 5.	1. [redacted] climate change impacts on water 2. 3. 4. 5.
Critical Issue *c*: Water conservation	1. 2. 3. 4. 5.	1. Continue ↑ Research on ways to use water more 2. efficiently (re-use, dual use, [redacted] better irrigation techniques, water transport, 3. etc.) 4. 5.

Hawaii

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Competing uses of water	1. -Studying impact of water re-distribution 2. to streams vs. 3. irrigation vs. urban use. 4. 5.	1. More science based 2. decision making in water allocations 3. 4. 5.
Critical Issue *b*: water quantity & availability	1. -Studying proliferation 2. of groundwater, 3. removal of 4. endocrine disruptors and medical wastes 5.	1. (1) Practical plans, and 2. policy changes for 3. more use of safe 4. reclaimed water in irrigation. 5. (2) Impact of climate change on water quantity & quality
Critical Issue *c*: water conservation	1. -Catchment systems 2. research and 3. extension support 4. (but declining due to loss of faculty) 5.	1. -Greater focus on 2. ~~catchment systems~~ 3. catchment systems 4. for Pacific 5. Islands.

Breakout #2 — **RESEARCH**

ARIZONA

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing uses	1. Policy and work with competing interests. 2. ~~Water~~ Tribal lands 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* quality & availability.	1. Transport + fate of emerging Contaminants 2. Ecohydrological controls on land surface-atmosphere interactions 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:* Water Conservation	1. Ecohydrology 2. Reuse, Recycling 3. Additional uses for the same water (eg. ~~Res.~~ quality) 4. ~~Other~~ Plant science to conserve H2O. 5.	1. Genomic audit of water/salinity genes for western plants 2. 3. Better sensors & systems for irrigation management. 4. 5.

Breakout #2 — **RESEARCH** NM

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* COMPETING ISSUES	1. WATER ECONOMICS AT THE REGIONAL LEVEL - SPECIFICALLY 2. GROUND WATER VS. ABOVE GROUND 3. WATER. 4. 5.	1. SHOULD RESEARCH THE VALUE OF WATER BETWEEN URBAN + AG. 2. MODEL THE CONSEQUENCES OF COMPLETELY FREE MARKET WATER VALUE/ECONOMY. 3. 4. 5.
Critical Issue *b:* QUANTITY & STRESSORS TO ↑ AVAILABILITY	1. WE HAVE A TARS/GRASS RESEARCH FARM TO EXPLORE SALINE RESISTANT 2. VARIETIES. 3. ACEQUIA RESEARCH INFLUENCES GRND WATER STORAGE & AVAILABILITY. 4. 5.	1. I SHOULD EXPLORE THE [redacted] INTER ACTIONS BETWEEN GROUND WATER + ABOVE GROUND WATER 2. SHOULD EXPAND RESEACH ON URBAN WATER HARVESTING AND STORAGE. 3. NEW METHODS OF STORAGE (RESEARCH) 4. SHOULD ENCOURAGE/DEMONSTRATE VALUE OF WATER CONSERVATION. 5. SHOULD EXPLORE USE OF SALINE WATER.
Critical Issue *c:* WATER CONSERVATION	1. DEVELOPING DROUGHT TOLERANT CROPS. 2. REMOTE DETECTION OF WATER STRESS/AVAILABILITY 3. 4. 5.	1. SHOULD RESEARCH THE IMPACT OF EFFICIENT IRRIGATION ON GROUND WATER RECHARGE. 2. MICROIRRIGATION IMPLEMENTATION + SUPPORT. 3. EDUCATION. 4. EXPAND THE DEVELOPMENT OF DROUGHT RESISTANT CROPS. 5.

Breakout #2 — **RESEARCH** CALIFORNIA **WATER** — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue ~~b~~: 2 Increase water availability	1. 2. Inability to apply true 3. precision irrigation technology 4. 5.	1. 2. 2 simultaneous research approaches 3. are needed: 1) look at effectiveness 4. of proximal & remote sensors 5. to detect water stress at the single plant level and 2) work with computational scientists & engineers →
Critical Issue *c:* 3 Water conservation	1. 2. Assess genomic capabilities 3. in Western States 4. 5.	1. 2. Apply sophisticated phenotyping 3. ~~tools~~ to develop varieties 4. which address plants' physiological 5. response to less water and more salt at the molecular level.

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* competing uses of H_2O	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* Water quantity	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:* Conservation	1. Developing drought tolerant 2. plants Through Biotechnology 3. Porta Canyon watershed 4. management area – i.e. 5. removing P.I. and measuring water levels, plant growth, animal re-use, Develop hydrologic model.	1. ① Develop working group to 2. study water efficient 3. economic species ② inter-disciplinary team to develop new plants 4. that are salt & drought tolerant that ~~continue~~ support ag. production 5. ③ Increase funding for research, teach and outreach programs

⑤ climate change, a need requires feature plant

④ Increase capacity @ LGAs to increase deployment & new feeds tools

CSU

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing Uses of Water	1. DARE - Compact - interstate 2. economics / water use 3. Water Institute - education analysis for policy makers 4. Ag / Wildlife / Recreation 5.	1. 2. Δ consumers perspective of aesthetics 3. 4. 5.
Critical Issue *b:* Water quantity / Strategies to increase availability	1. 2. Water Science research 3. remote sensing assessment 4. Monitoring Networks 5.	1. 2. Monitoring & interpretation of Changes in Snowpack / runoff & th downstream impacts 3. 4. 5.
Critical Issue *c:* Water Conservation	1. Recycling of gray water 2. Irrigation techniques 3. Genetics / CWU 4. Engineering storage / transfer 5. Landscapes - industrial / homeowner	1. 2. 3. 4. 5.

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Conflicting use	1. Multistate work on WATER POLICY 2. 3. 4. 5.	1. – Revist water laws – ? 2. How much H2O is Needed 3. & for food productio 4. 5.
Critical Issue *b:* WATER QUALITY	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:* Conservation	1. Multistate work on policy, 2. Micro irrigation / 3. 4. 5.	1. Work @ community level to 2. implement conservation practices year round. 3. 4. 5.

OREGON

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. 2. Allocation for protection of endangered species. 3. 4. 5.	1. 2. Assess options to improve water rights management "use it or lose it" can waste water. 3. 4. 5.
Critical Issue *b:*	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:*	1. Injection of surface 2. water during high flow 3. periods into groundwater reservoirs. 4. Microirrigation 5. technology.	1. ~~Groundwater injection~~ 2. Wastewater reclamation 3. for biofuel production 4. 5.

Breakout #2 — **RESEARCH** CA

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competitive use of water ag v urban water rights	1. 2. (1) 11 different UC water centers 3. (2) UC statewide: Calif Institute Water Resources – coordination of UC effoits w/ state / fed water agencies 4. 5. (3) research being done on all 3 critical issues	1. 2. (1) continue interagency coop efforts 3. (2) continue research on efficient irrigation systems 4. 5. (3) produ practices on water quality (nitrates, pesticides etc)
Critical Issue *b:* increase availability above / belowground distribution	1. 2. 3. 4. 5.	1. (4) social science research 2. on consumer behavior 3. (5) research on the interaction 4. of above & belowground 5. water sources / uses
Critical Issue *c:* Water Conservation	1. 2. 3. 4. 5.	1. (6) conduct research on green 2. water as well as blue water 3. 4. (7) incentivize conservation 5. (8) focus on water reclamation

(9) water markets that link ecosystem services

(10) ...

Breakout #2 — **RESEARCH** Montana **WATER** — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing uses	1. Water rights 2. How to keep other states 3. From regulations & policies 4. Energy production 5.	1. Water quality w/ energy 2. production 3. 4. 5.
Critical Issue *b:* quality	1. Stream quality 2. 3. 4. 5.	1. more impact production 2. practices (funding) 3. 4. 5.
Critical Issue *c:* conservation	1. 2. 3. 4. 5.	1. irrigation systems research 2. 3. 4. 5.

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Wyoming

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing uses	1. Low-H_2O ~~[illegible]~~ using ~~[illegible]~~ native plants. 2. Interstate water compacts 3. Watershed management. water transfers 4. 5.	1. More research on methods to conserve H_2O at the Home-owner level. 2. 3. 4. 5.
Critical Issue *b:* Water quantity/ strategies to increase availability	1. Watershed management ~~evaporative loss~~ ~~water transfers~~, 2. in-stream flow, snow-pack, water infiltration rates 3. 4. 5.	1. Storage of H_2O below ground to decrease evaporative H_2O loss. 2. 3. 4. 5.
Critical Issue *c:* Water conservation	1. Irrigation mgmt. - crop H_2O use efficiency 2. Ecosystem services provided by Agricultural practices 3. 4. 5.	1. Re-evaluate water rights laws 2. or encourage conservation via consempensate payments for conservation - Create 3. H_2O markets centered around 4. ~~cause~~ more conservative uses. 5.

Utah

Breakout #2 — **RESEARCH**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. 2. 3. 4. 5.	1. Develop water trading 2. or market methods. 3. (What has worked What hasn't worked) 4. Analyze markets 5. as much as possible Let forces work to allocate & conserve
Critical Issue *b:*	1. 2. 3. 4. 5.	1. Water measurement is 2. positively correlated to conservation of water 3. Education - 4. 5. Change federal law
Critical Issue *c:*	1. 2. 3. 4. 5.	1. WRI & other water allocation 2. rules by demonstrating 3. inefficiencies. 4. Economic impacts 5. of water quality rules -

USV

Breakout #3 — **EXTENSION**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. Statewide "Slow the Flow" program 2. 3. 4. 5.	1. Expand urban education 2. and monitoring programs share regionwide 3. 4. Water efficient landscaping 5.
Critical Issue *b:*	1. Changes in state and NRCS 2. policies that support conversion from flood to sprinkle systems 3. 4. 5.	1. Improve / modernize delivery 2. systems 3. 4. 5.
Critical Issue *c:*	1. ~~Etg~~ Changing Pricing structure 2. to encourage conservation 3. Public education media campaigns 4. 5.	1. Price water at its true value 2. 3. 4. 5.

Breakout #3 — **EXTENSION**

Wyoming

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Scarcity — competing uses of water use it or lose it water law	1. irrigation / crop response education 2. → crop production in low water years for irrigation districts 3. 4. 5.	1. irrigation / crop response — education 2. water efficient crop research and education. 3. → education for policy makers on inefficiency of current water law approaches. 4. 5.
Critical Issue *b:* Water Quantity and quality distribution of Water Snow pack	1. monitoring work shops for conservation district 2. Education for irrigation districts managers water 3. - Water law workshops 4. - research on water quality 5.	1. Collaborations education on water quality - EPA/ 2. DEQ/ - research and education on background levels of quality. 3. 4. 5.
Critical Issue *c:* Water conservation Effluent Utilization Policies that do not support conservation	1. irrigation / crop response 2. education / research net work of soil moisture monitors 3. 4. 5.	1. 2. 3. 4. 5.

UNIV OF CALIFORNIA

Breakout #3 — **EXTENSION**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. Coordination of some activities of all Water Centers across the 10 campus UC 2. system. 3. Compilation of research information and delivery of management practices to 4. reduce/eliminate nitrate addition to groundwater 5. water use efficiency, research irrigation systems (such as burried drip for alfalfa) research,	1. All in what is being done. 2. Compilation of best water management practices for major commodities, municipal/industrial landscaping, and home gardens into easily utilized web/mobile device interface. 3. 4. 5. Convening summits of water mgmt agency/irrigation district/ag sectors/
Critical Issue *b:*	1. and development of educational programs and products. 2. Applied research and outreach on forest mgmt strategies to enhance 3. water production and timing of water release. 4. Applied research and outreach on livestock impacts to water quality and 5. mitigation of impacts.	1. University/etc to discuss best approaches to education and implementation 2. of water quality practices. 3. Develop models for addressing climate variability (amounts of precip, timing 4. of precip) 5.
Critical Issue *c:*	1. Water use efficiency and conservation education programs by Master 2. Gardeners for homeowners, etc. 3. Evaluation of crop/plant varieties which are productive under lower 4. water regimes. 5. Applied research and outreach regarding use of reclaimed water for agricultural production.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION** **WATER** — Natural Resources Management

University of Nevada —

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Amount of water is affected by climate change - transfers are important	1. Public ed. 2. conservation education 3. Climate modelling & prediction 4. Weather trend analysis 5. Ecosystem monitoring in areas that serve as water sources	1. Focus on risk planning & management associated w/ weather extremes 2. 3. 4. 5. Focus on benefits transfers
Critical Issue *b*: Quantity - climate change, socio-economic change, inappropriate storage and delivery systems	1. Climate modelling 2. 3. 4. 5.	1. Translation into guidelines for planning, especially in the case of new or replacement infrastructure. 2. 3. 4. 5.
Critical Issue *c*: Conservation, Policies that do not encourage conservation	1. Workshops on drought-tolerant, low water use landscapes 2. 3. Water banking - economic & political research. 4. 5.	1. More emphasis on multi-disciplinary team approaches to ~~emphasizing~~ risks associated w/ weather 2. 3. 4. 5.

Montana State

Breakout #3 — **EXTENSION** **WATER** — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:*	1. Developing Relationships and 2. collaborations w/ producer groups and other users to deal with 3. issues 4. 5.	1. continue the dialogues 2. 3. 4. 5.
Critical Issue *b:*	1. Input to developing state 2. water plan 3. 4. 5.	1. 2. Adjudication must be completed before policy changes and 3. educational programs can proceed 4. 5.
Critical Issue *c:*	1. Research and education on 2. varieties and production methods for effiency use 3. of water. 4. 5.	1. 2. 3. 4. 5.

Univ. Hawaii - Manoa

Breakout #3 — **EXTENSION**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing uses	1. ~~Per~~ ~~Policy~~ Public issues education faculty. 2. 3. 4. 5.	1. ~~Hire faculty to Broad base~~ 2. Better partnerships with all those working on water issues from coastal to deep water → watersheds etc. 3. € 4. 5. Educating policy makers on ~~significant issues~~ Resources.
Critical Issue *b:* Quantity/ strategies to ↑ availability	1. Partnership w/ Water Research Center. 2. 3. 4. 5.	1. Incorporating indigenous knowledge systems w/current technologies (education piece) 2. 3. 4. 5.
Critical Issue *c:* Conservation	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #3 — **EXTENSION**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Water use decisions	1. 2. 3. 4. 5.	1. modify water rights to encourage 2. conservation -- no more ~~use~~ it or lose it. 3. 4. 5.
Critical Issue *b:* water quantity strategies	1. 2. 3. 4. 5.	1. create water collection systems 2. for homeowners, public, + private buildings. 3. 4. 5.
Critical Issue *c:* Water conservation	1. 2. 3. 4. 5.	1. xeroscaping education for public 2. + business. 3. County + city govts ~~should be~~ required 4. to move to xero scape landscaping as a model for others 5. create incentives for home owners to use less rather than more

Breakout #3 — **EXTENSION**

Gregen

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* COMPETING USES	1. 2. 3. 4. 5.	1. CONTINUE COMMUNITY CONVERSATIONS 2. AROUND INTEGRATED EXTENSION 3. 4. 5.
Critical Issue *b:* QUANTITY	1. IRRIGATION EFFICIENCIES 2. 3. 4. 5.	1. OPTIMIZE WATER DISTRIBUTION 2. THROUGH CONVENING 3. COMMUNITY CONVERSATIONS 4. 5.
Critical Issue *c:* CONSERVATION	1. 2. 3. 4. 5.	1. DEVELOP, TEST AND EXTEND 2. MARKET-BASED APPROACHES 3. TO WATER USE 4. 5.

New Mexico

Breakout #3 — **EXTENSION**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing use water Ag vs urban water rights In-stream use / ESA	1. 2. Policy work w/ Ag — Basic Endorsed SIP 3. 4. 5.	1. 2. Help facilitate water Adjudication process 3. 4. 5.
Critical Issue *b:* Water quantity / Strategies for ↑ availability Above / below ground storage - Drought	1. 2. Acequia Hydrology Studies / groundwater recharge 3. Irrigation Technology workshops 4. Work WRRI on State water Budget Work w/ Indian Affairs to Address 5. Windmill / water Availability issues	1. 2. Enhance Efforts w/ Indian Affairs assess livestock water issues + provide community based solutions 3. 4. Enhance technology workshops for livestock waters - Ise-solar/ propane to enhance efficiency/ Produce 5. expand workshops focusing on enhancing efficiency of livestock waters
Critical Issue *c:* Water Conservation Conservation strategies	1. Xeroscaping Programs 2. Water use Education Programs 3. Drought Mgt Plans 4. 5.	1. 2. Enhance water Conservation + Educational programs - particularly in urban areas 3. 4. Enhance Drought Mgt. Programs + water Conservation 5.

Breakout #1 — **TEACHING** . **WATER** — Natural Resources Management

↳ : developing

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* competing usage	1. 2. USE IT OR LOSE IT conflict 3. 4. 5.	1. 2. major ? 3. REQUIRE A MINOR 4. in soil (OR) WATER 5.
Critical Issue *b:* QUANTITY & STRATEGIES to increase AVAILABILITY	1. 2. 3. STRATEGY ≠ 4. 5.	1. 2. 3. TACTIC 4. 5.
Critical Issue *c:* CONSERVATION	1. 2. 3. 4. 5.	1. REWARD / ACKNOWLEDGE 2. effort : result 3. 4. 5.

Breakout #1 — **TEACHING**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* competing uses of H_2O Ag – urban H_2O rights	1. 2. Remote sensing to weather and climate 3. Hydrology 4. hydrogeology 5. urban landscape management	1. WATER needs to be 2. incorporated into 3. nearly ~~any~~ subjects we 4. teach! 5.
Critical Issue *b:* strength in documentation water law. H_2O Quantity – Availability.	1. 2. Pacific Island 3. geologic and climatic history 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c:* H_2O conservation	1. 2. management + recycling organic waste 3. Environment 4. economics 5.	1. 2. 3. 4. 5.

IDAHO

Breakout #1 — **TEACHING**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing uses	1. 2. 3. 4. 5.	1. Economic Analysis 2. 3. 4. 5.
Critical Issue *b:* Quantify Strategies to increase availability	1. 2. 3. 4. 5.	1. ~~Conflict resolution~~ 2. 3. ~~Engineering~~ Hydrology 4. 5.
Critical Issue *c:* Water Conservation	1. 2. 3. 4. 5.	1. understanding incentives 2. 3. 4. 5.

NEVADA

Breakout #1 — **TEACHING** **WATER** — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing uses of water	1. Have Hydrological Science & Geohydrology programs: both are multidisciplinary 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *b:* ~~Reduc~~ Increasing availability	1. 2. 3. 4. 5.	1. Invest in Agricultural engineering undergraduate & Graduate programs 2. 3. 4. 5.
Critical Issue *c:* Water Conservation	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Breakout #1 — **TEACHING**

CA

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing Uses	1. 2. 3. Specific Water Course 4. Coordination of water activities across our campus with inclusion of all 8 colleges 5.	1. 2. Enhance University Wide Water awareness 3. University wide water literacy course 4. 5.
Critical Issue *b:* Quantity Strategies to ↑ availability	1. 2. Working to create a water literacy GE course 3. 4. University wide reading "The Great Thirst" 5.	1. 2. University wide reading 3. 4. 5.
Critical Issue *c:* Conservation	1. Water related - degrees - courses 2. 3. Campus based water conservation 4. 5. Campus wide Faculty co-hort in water new hires	1. 2. 3. 4. 5. Social Impact College of Social Science K-12 Curriculum Ed Water Economics Business Natural Resources Journalism / Communications (etc)

Breakout #1 — **TEACHING**

HAWAII

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a:* Competing Uses	1. 2. 3. 4. 5.	1. See (c) below 2. 3. 4. 5.
Critical Issue *b:* Strategies to increase availability	1. 2. 3. 4. 5.	1. Teach methods to 2. harvest rain 3. 4. 5.
Critical Issue *c:* Conservation	1. 2. 3. 4. 5.	1. ~~Educate, inform, ignore~~ Give 2. students perspective of 3. how much water is used for ag 4. other uses 5.

OREGON

Breakout #1 — **TEACHING**

WATER — Natural Resources Management

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Competing uses of water ag/urban use or lose in stream use	1. "Ensuring Water Quality & and Quantity" priority funding area - potential for more teaching resources 2. (2) Institute for Water & Watersheds → Water Res. Graduate Program 3. → Grad Certificate in Water Conflict Mgmt & Transformation 4. 5.	1. IEW offer sessions for Ag in Classroom summer Ag Inst. 2. 3. 4. 5.
Critical Issue *b*: Water Quantity above/below ground distrib of water	1. → OnLine Sustainable NR Grad - Certificate ~~→ Professional Certif~~ 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c*: Water Conserv effort/ utility conserv strat Policy do not encourage conserv	1. 2. 3. 4. 5.	1. First Year Common Reading for any of these topics 2. 3. 4. 5.

Big Thirst - Campus Wide Reading

Breakout #1 — **TEACHING** Workforce Development **WATER** — Natural Resources Management COLORADO

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Competing uses of H_2O * Ag vs Urban * Wetland Regul - used or lost * In stream use / ESA	1. Strategic Initiative to focus 2. Coursework / Internships 3. Seminars and Speakers 4. 5. some for all	1. incorporate into all curricula 2. 3. Use Experiment Stations 4. 5.
Critical Issue *b*: Quality / Strategic to ↑ Availability * above ground / below ground * drought - climate change * distribution of H_2O ecology, socio-econ	1. Strategic Initiative 2. 3. 4. 5.	1. 2. 3. 4. 5.
Critical Issue *c*: Water Conservation * Efficient Utilization * Conservation Strategy * Policies do NOT encourage * Conservation - how to do this	1. Strategic Initiative 2. 3. 4. 5.	1. 2. 3. 4. 5.

WYOMING

Breakout #1 — **TEACHING**

WATER — Natural Resources Management

WyCHEG? REWM?

Critical Issues	What *is* being done?	What *should* be done?
Critical Issue *a*: Competing uses of water • ag vs urban • water rights "use it or lose it" • in stream use/ ESA	1. Rangeland Ecology & Watershed Mgt degree 2. WyCEHG (Wyoming Center for Environmental Hydrology & Geophysics) – multi-disciplinary 3. – industry partners 4. – field camps @ Teton Science School. 5.	1. See group sheets 2. 3. ? 4. 5.
Critical Issue *b*: Water quant./strategies to incr. availability • above ground/below ground capture • Drought • Distribution	1. ? 2. 3. 4. 5.	1. 2. 3. ? 4. 5.
Critical Issue *c*: Water Conservation • Efficient utilization • Conservation strategies • Policies do not encourage conservation	1. ? 2. 3. 4. 5.	1. 2. 3. ? 4. 5.