Weed Research Roundtable – UC Davis
Aug. 26, 2005
Minutes

Jake – Every year more weeds and fewer native plants. Attempts for funding haven't been successful. We don't know what we need to know. Need clarity on defining needs.

Doug – Key Cal-IPC role is ensuring contact between researchers and field practitioners. Three-hour meeting can't cover all the topics. Want to put together working groups to write summaries on each topic. Proposed process is roundtable followed by several months of working groups, with draft document circulated for feedback resulting in a more formal report.

Cal-IPC will start webpage with resource library for papers, links, etc.

Note: Don't forget the Cal-IPC Symposium, Oct. 6-8 (plus pre-symposium field course on Oct. 5). California State University – Chico. Www.cal-ipc.org/

The UCD Bioinvasion program is holding a meeting September 21 on invasives related to horticulture and the aquarium trade ("Gardens and Guppies"). It will bring together researchers and industry. Contact Adrianna Muir (aamuir@ucdavis.edu) for information. http://www.cpb.ucdavis.edu/bioinv/g&g.html

Proposed process

Aug.	Initial Roundtable
Oct.-Dec.	Working groups on each research topic prepare brief written summary
Jan. 2006	Complete draft document
Feb-Mar	Draft document circulated for comment
Apr-May	Feedback incorporated into final document

Additions to attendees –
Ray Carruthers - NRCS
Marcel Rejmanek, UCD

Weed Research by Topic

1. Weed biology and ecology
    a. Summary (Joe D.) – Need to understand weaknesses of weeds to control them. One big gap is seedbank dynamics in natural systems. Important in determining length of management program. Ecology – understanding interactions between native and invasives under different conditions. Missing info on abiotic impacts. Info on higher trophic level impacts (forage, displacement of species) also sparse.
    b. Peter – Impacts on soil biosphere, mycorrhizae. Gorse and broom infestations on coast affect soil nitrogen and long-term chemical processes.
    c. Tara – Cumulative effects of an assemblage of species.
    d. Working group – Joe DiTomaso, Lars Anderson, Jeff Corbin

What to do with this? General here, but need some specific ties to high-priority weeds to make it useful for designing projects, grad student theses, etc. General discussion followed by long-term needs and examples of specific needs. Bibliography needed on each topic.

2. Biogeography and distribution of weed systems
    a. Summary (Steve) – Continuum from global trends of invasion
        i. Getting data
            1. How to inventory weed distributions and human activities (control)?
            2. Remote sensing
            3. How complete are different methods (on the ground accuracy), how to motivate people
        ii. Storing data
            1. central consolidators
            2. Local tools – WIMS, etc
        iii. Weed spread –
            1. vectors
            2. mathematical models
            3. colonization (persist or not)
            4. predicting spread and colonization, using available on-line climatic data
        iv. Link between weed distribution and prioritization
            1. Where to focus our efforts (modeling)?
    b. Additions
        i. Monitoring control efforts, good use of map data
        ii. NASA-remote sensing (Ray C.): combined USDA/NASA center proposed to get specialists and more resources to focus on weeds (saltcedar, etc.) Doug – improve relations between ecologists and GIS tech people\
        iii. Using maps to understand dispersal, need to know how they get around to control them (Lars)
    c. Working group – Steve Schoenig, Tara Athan, others to be recruited

3. Risk assessment and predictive systems
    a. Benefit-cost ratios for early intervention in Australia was calculated to be huge. Most weeds brought in deliberately, unlike other invasives. Need more work on risk assessment and prevention. Need justifiable, defensible system to exclude bad actors (Rick R.)
    b. Early detection/eradication (Stuart W.) – How to use limited resources to be effective.
    c. Transforming species (Joe B.) – What characteristics of plants make them landscape transformers? Will drive management options.
    d. Management of areas that have already been transformed – What happens next? Land managers point of view (Cynthia R.)
    e. Rate of spread. Combine with impacts to determine which are the worst species. (Marcel R.)

f. Types of areas invaded often disturbed. Invasion is a symptom, not the cause of some changes (Marcel R.)
g. Cultural factors affecting invasion – disturbance, horses (Doug)
h. Overlap with economic impacts (Tara A.) – What do you lose by excluding a plant that won't become invasive. Economic models to value those losses.
i. Rick Roush, Bill Kuhn, Marcel Rejmanek, Cyndi Roye, Steve Schoenig

4. Effectiveness of control methods
    a. Joe – Smallest gap is knowing what method to use because we have limited tools available. In wildlands, interested in more than just control. Techniques can have effects on environment. How to use control in a way that increases ecosystem function. What to use as part of integrated approach?
    b. Long-term success of methods (beyond a 3-year grant). What techniques result in sustainable management?
    c. Should set restoration as the goal (Lars).
    d. In aquatic environment, need information on effects of methods. Difficult system to work in. Only a few active ingredients can be used. (Lars)
    e. Look at social climate. Consider not only management, but how to bring in community that relies on local environment (Peter)
    f. Cooperation between consultants and agencies (Jinnah H.)
    g. On Santa Cruz Island, plots with fennel had more native species that plots treated to remove fennel. Birds brought in seeds (Marcel R.)
    h. Control strategies that take into account what's going to come in next (Renee S.)
    i. Thresholds. Where to direct efforts if can't target entire infestation. Have mythology but not backed up (Tara A.)
    j. Control methods that will work with management in progress (Jeff C.)
    k. Working group – Carla Bossard, Joe DiTomaso, Cyndi Roye

5. Environmental and cultural factors affecting invasion
    a. Nitrogen deposition is a big problem. Overlay nitrogen deposition and biodiversity database. Know N intensifies annual grass invasion where they used not to grow. Little documentation on what happen to other weeds. Probably really responsive to N. Immediate threats are more problematic than long-term problems from global warming, etc. (Stuart W.)
    b. Grazing
    c. Impacts of roads – disturbance corridors and deposition from cars. Local impacts in the middle of regional plumes of N.
    d. Effects of extreme climate fluctuations. But annual grasses also prevent erosion.
    e. Impacts from horses.
    f. Working group – Mel George, Stuart Weiss, Bill Kuhn, Linda Spiegal, Bonnie Davis

6. Development of biological control agents
    a. How biocontrol works - If using biocontrol, need weeds that are widespread. Accepting that they will stay here; not eradicating them. Need foreign exploration to determine natural enemies that can be translated into biocontrol agents, test

safety in US. All funding is public, no private incentive since not contained. (Mike P.)

b. Classify Cal-IPC list of weeds by suitability for biocontrols. Make priorities (Doug)
c. Follow-up – What happens after agent is approved and released? Universities could start project examining how the plant community responds after release of agent. (Mike P.) Treatment follow-up will help credibility of biocontrol with the public (Jake S.)
d. How does biocontrol integrate with other methods?
e. Research on pathogens. Ray – inhibited by lack of facilities, paranoia about effects. Pathogens tend to be so focused that they can't be widely applied. Look at pathogens similar to insect populations.
f. Efficacy of biocontrol agents. Link with plant ecologists to know which will have impacts on target species without harming natives.
g. Working group – Mike Pitcairn, Jake Sigg, Ray C, Joe B

7. <u>Evaluation of horticultural selections (Doug)</u>
    a. Which species are invasive, where, and how?
        i. Ivy, pampas grass, cultivars, sweet broom – Need good data to negotiate with nursery industry.
    b. Who should pay for evaluation? Nurseries, universities… (Adrianna M.)
    c. Proof that popular plants really are spreading into wildlands.
    d. Are self-regulation options for nurseries effective?
    e. Can hybrids be used to make invasive species less invasive? Propagation techniques to reduce invasiveness.
        i. Infertile hybrids can be safe (Marcel Rejmanek)
    f. Working group – Cal-IPC, Adrianna Muir, John Randall?

8. <u>Economic impacts (Tara A.)</u>
    a. Data – Valuation. Evaluating intangibles but also water budgets, etc. Benefits transfer techniques can be used. Databases are available. Need to construct studies to use existing benefits transfer models for people who can't do their own economic modeling.
    b. Value uncertainty – Can only do ballpark estimates. Need to represent uncertainty honestly and incorporate into planning.
    c. Long-term scenarios – Need to incorporate climate change, etc.
    d. Developing models – Lower priority because a lot of people are working on it. Need to integrate bioeconomic models so that they answer questions you need answers to (proper study design). TNC's decision management system is designed for conservation, but need other decision-support tools for other management goals, or projects that combine management and economics.
    e. Allergy problems from annual grasses (Stuart). (See Sean Anderson at Stanford).
    f. Testing models after they've been used in order to re-calibrate them.
    g. Impacts of aquatic invasives – mosquitoes, etc. (Lars)
    h. Need database on what's actually being spent by landowners (Mike P.)
    i. Impacts of weeds on recreation

j. Contact UCD economists recommended by Ray.
k. Working group – Tara Athan, Bonnie Davis, Adrianna Muir

9. Policies and regulations for invasive plants (Gina S.)
    a. Main gap seen at CDFA is prioritization. What should the money be spent on? Need information in order to talk to legislators and explain what's being done.
    b. Noxious weed list (Doug) – How to integrate environmental weeds into state noxious weed list?
    c. Convince county ag commissioners to make nurseries put signs on invasive plants at nurseries if they don't want to ban them outright. (Joe B.)
    d. Who is researching environmental policies and how to move this process along?
    e. Problem: Nothing gets listed until it's already a huge problem. Cat is out of the bag. Need risk assessment and prediction or else we're always losing (Carla B.)
    f. Need to focus more on education at the grass-roots level. Get people to think about what they're doing. Targeting legislators may not be effective, at least at national and state levels (Peter W.).
    g. Group is working with Assemblywoman Wolk to work on coordinating weed management agencies. Working with municipalities is more effective that working at the statewide level. We could provide case studies and get legal opinions on what could be done. (Lars)
    h. National level – we need to give input to National Invasive Spp. Council
    i. Cooperation and streamlining among agencies to help consultants that are working on weeds.
    j. Point out where impediments are. Doesn't work if it takes a year to get a permit for rapid response.
    k. Working group – Lars Anderson, Jeff Corbin, Jinnah Hansen, Tara Collins. Find some reps from USFWS and Fish and Game.

10. Social issues (Mel George)
    a. What are barriers to using control methods? - economics, education, political issues (air quality and burning). Need to get landowners to use the control methods that have been developed. Landowners need education and need to be invested in controlling invasives, or all the ecology work is a waste of time.
    b. What are most effective methods for reaching the public?
    c. Find out what practices people are willing to use and concentrate research on those.
    d. Need to apply social science methods to invasive plants in order to determine what combination of regulation, education, incentives, service delivery, and publicity is most effective. (e-mail from Pete Holloran, UCSC)
    e. Working group – Mel George, Pete Holloran (UCSC), Don Mayall

11. Restoration
    a. Research needed on long-term restoration in order to consider endangered species issues, etc. Need examples of cases where programs have worked. Don't get hung up on using specific control methods. (Lars A.)
    b. How long do you control a weed before you can start restoration? (Renee S.)

c. What are you working towards? (Ray C.) Choose between complete eradication of all invasives, or replacing one invasive with something that will allow ecosystem function to be retained (Peter W.)
d. Triage – Prevent weed from spreading even if you'll never get rid of it entirely (Rick R.)
e. Working group – Peter Warner, Lars Anderson, Cyndi Roye

12. Genetic and evolutionary issues
    a. Cal-IPC has a lot of gaps in knowledge about hybridization within genera or families. Which natives hybridize with invasives? What are long-term impacts of hybridization. (Peter)
    b. Systematics unclear for many weeds (e.g. water primrose). Need better support services (Ray C.)
    c. Effects on pollinators/ pollen swamping (Joe. D.)
    d. Important for defining the problem for regulation
    e. Working group – ?

Funding needs and structures

1. Existing funding structures
    a. Mitigation money for power plants (PIER program at CA Energy Commission)
    b. UCD Integrated Pest Management program (Exotic Pests and Diseases Program)
        i. Needs more proposals on early detection and response. Needs to relate to agriculture and California. www.ipm.ucd avis.edu. Upper left of webpage has link to exotic pests program.
        ii. Could fund most topics on today's list as long as they have a research component. Funds broad range of invasive spp. Topics.
        iii. Could be used as an example as a successful program to tell Congressmen (Calvin – Riverside, and Feinstein support it)
    c. National Research Initiative grants (very competitive) – need to be mechanistic and have preliminary data
    d. USDA prefers to fund multi-state projects

2. Funding needs
    a. USDA has a lot of money for implementation but little for monitoring (Maria Ryan).
    b. Trained eyes on the ground are the most effective use of monitoring money. Train people who aren't professional botanists to look for new infestations.
    c. Would be nice if some funding efforts (eucalyptus borer) didn't conflict with weed management goals

3. Other avenues for funding
    a. CALFED – What is its future? Prop. 40/Prop 50 water quality grants are a boondoggle
    b. Bill in legislature would fund environmental projects related to roads. Weeds might be fundable as a road impact. Funded by tax on vehicle reg. In coastal counties.

    c. Federal cross-cut budget – president picks priorities. Invasives is a priority. Agencies asked to submit proposals. A group in CA is trying to put together a proposal combining several agencies for project to block yellow starthistle spread in the Sierras.
    d. Fire break funding can be used for controlling weeds on the ground
    e. Other funding on a local level
4. Working group to identify existing sources and new avenues – Cal-IPC, Ray Carruthers, Rick Roush

Next steps

Cal-IPC: Distribute notes, make webpage for posting materials, can be host for conference calls, make format for working group reports, promote in newsletter.