PINEMAP's Required Graduate Course

An innovation in integrated education

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Science Presentation

PINEMAP 2014 Annual Meeting | May 14—16, 2014

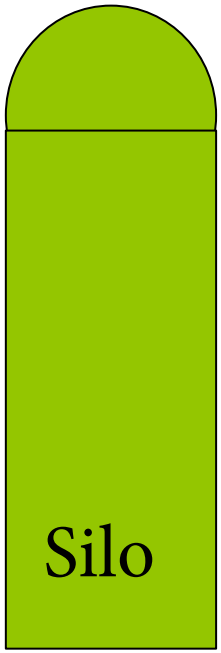
PINEMAP is a Coordinated Agricultural Project funded by the
USDA National Institute of Food and Agriculture, Award # 2011-68002-30185.

United States Department of Agriculture

National Institute of Food and Agriculture

Graduate Education

- Advanced coursework to build expertise in the discipline and gain skills in data collection and analysis methods
- Deep and focused
- Mentoring with advisor, working on a project
- Independent and individualized
- Single or first author papers
- Academic job



But in Reality

- Real problems require input from several disciplines
- Some problems require work outside of any discipline
- Research findings should be useful to stakeholders

Can graduate education help prepare students to work on interdisciplinary problems, with stakeholders, and with people from other disciplines?

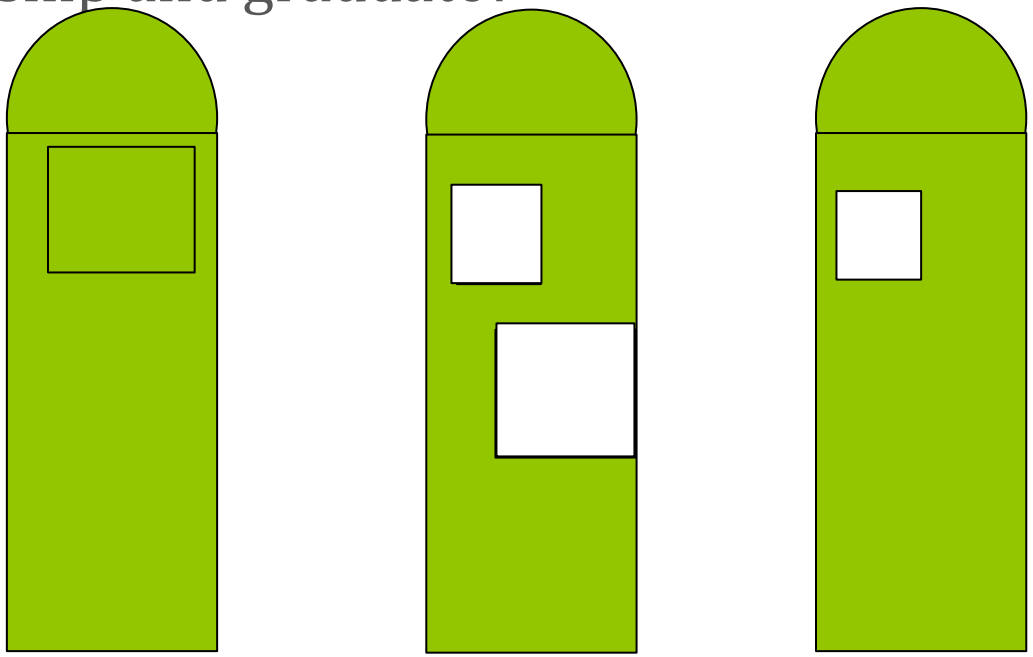
National Research Council

A New Biology for the 21st Century (NRC, 2009):

"The essence of the New Biology, as defined by the committee, is integration—re-integration of the many sub-disciplines of biology, and the integration into biology of physicists, chemists, engineers, and mathematicians to create a research community with the capacity to tackle a broad range of scientific and societal problems" (page 3).

PINEMAP Offers Opportunities

- This is an integrated research project
- We have graduate students
- How can they be engaged in the essence of integration – and still meet the expectations for disciplinary scholarship and graduate?



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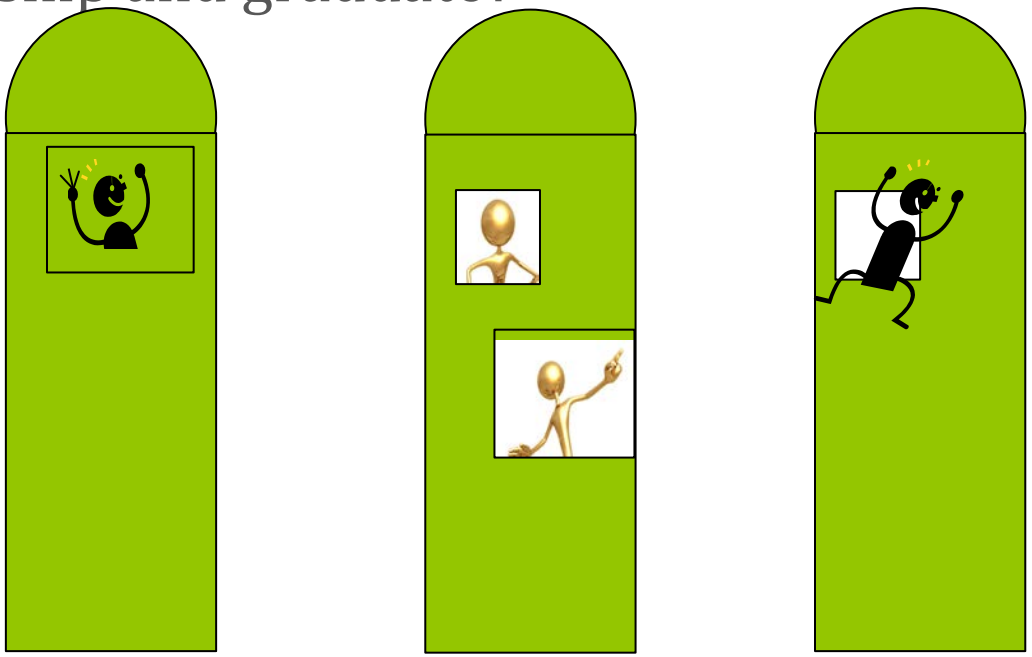


We Created a Course

- Expected graduate students would take it
- Independent study at their home institution
- Presentations over webinar, readings, discussion board
- Group assignments
- 9 different institutions
- Academic calendars vary by 3 weeks

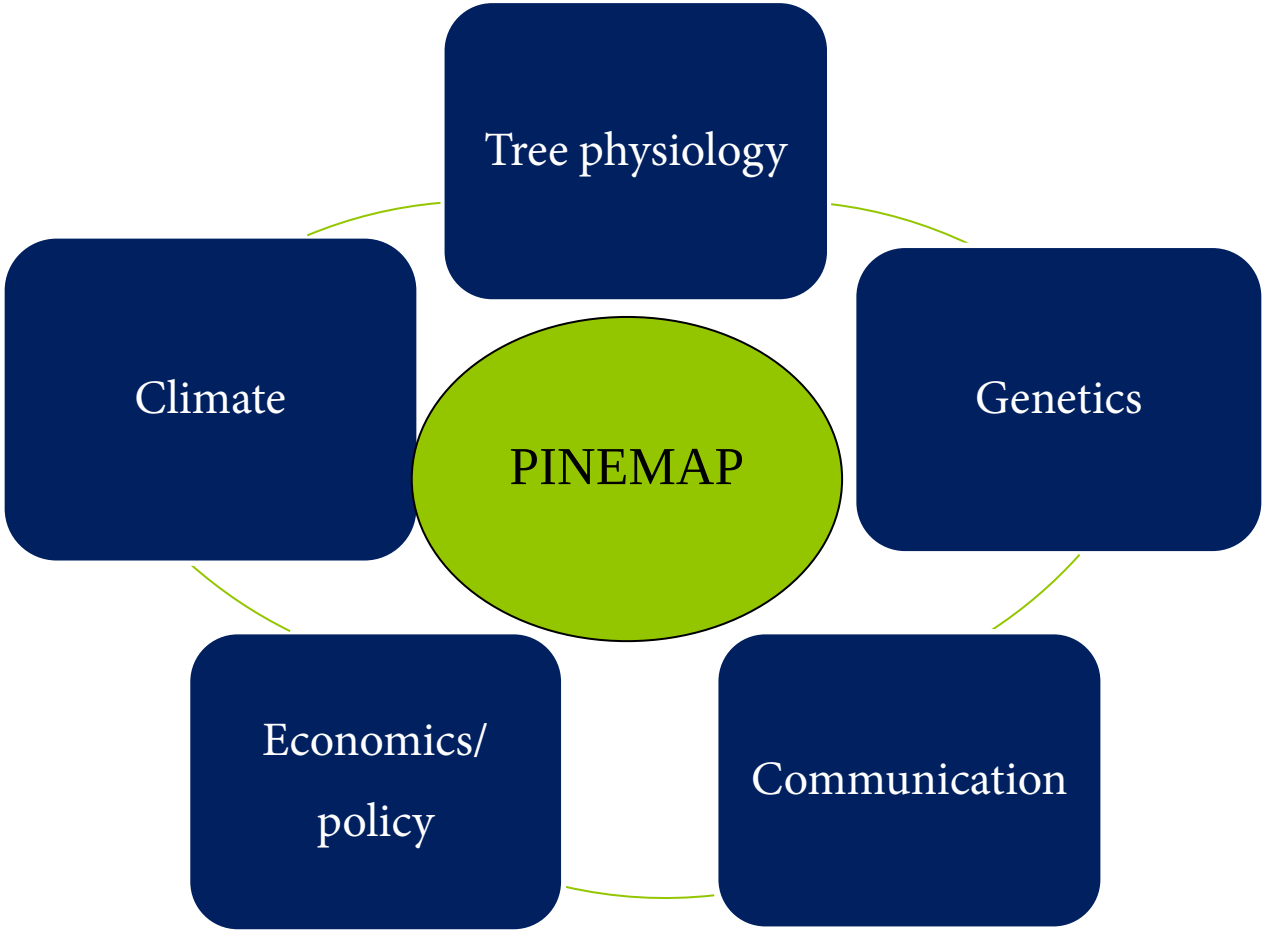
Three Broad Goals

- Introduce the disciplines involved in PINEMAP and the role they play in addressing southern pine and climate change,
  - Engaging students in exploring climate change mitigation and adaptation in southern pine
  - Presentations by faculty that introduce their discipline
  - Readings that explain what we know and how we learn
  - Assignment to explore the ways people in your field do integrated research
- Introduce Cooperative Extension and the process for developing programs or materials that meet needs
  - Audience assessments
  - Group assignment to write a fact sheet
  - Evaluation skills to gather input from Extension specialists and revise fact sheet
- Build capacity for integration among research

Students from 9 Institutions and 6 Aims

- Year 1
  - 16 Ph.D. students
  - 6 M.S. students
  - 15 PINEMAP faculty
  - 2 guest lecturers
  - 1 group assigning within discipline
  - 1 interdisciplinary group assignment
  - Optional online discussion
- Year 2
  - 8 Ph.D. students
  - 11 M.S. students
  - 10 faculty
  - 2 taped webinars
  - 1 individual assignment
  - 1 interdisciplinary group assignment
  - Required online discussion

Course Topics

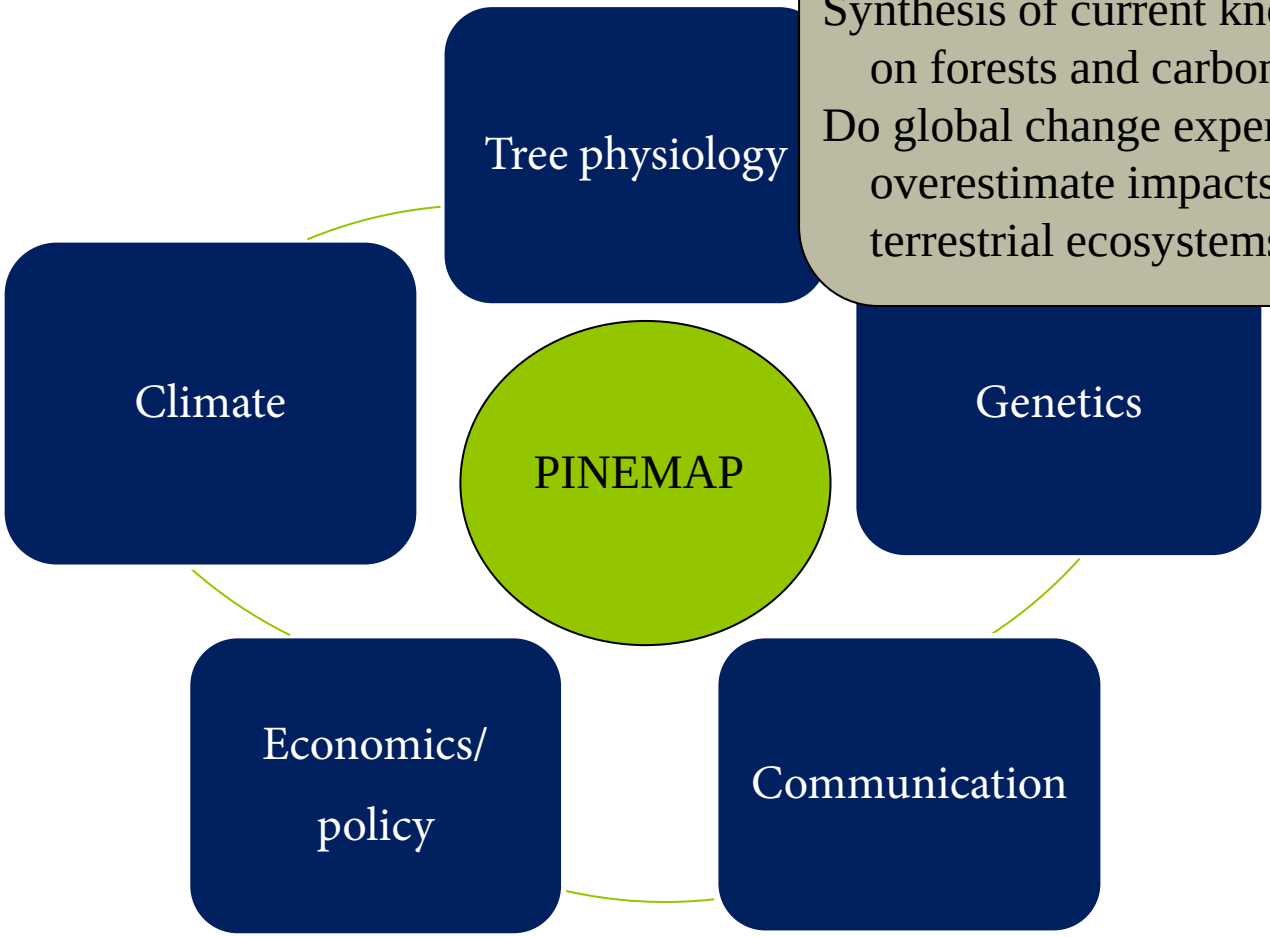


Some Readings

Forest management and stewardship

Synthesis of current knowledge on forests and carbon storage

Do global change experiments overestimate impacts on terrestrial ecosystems?



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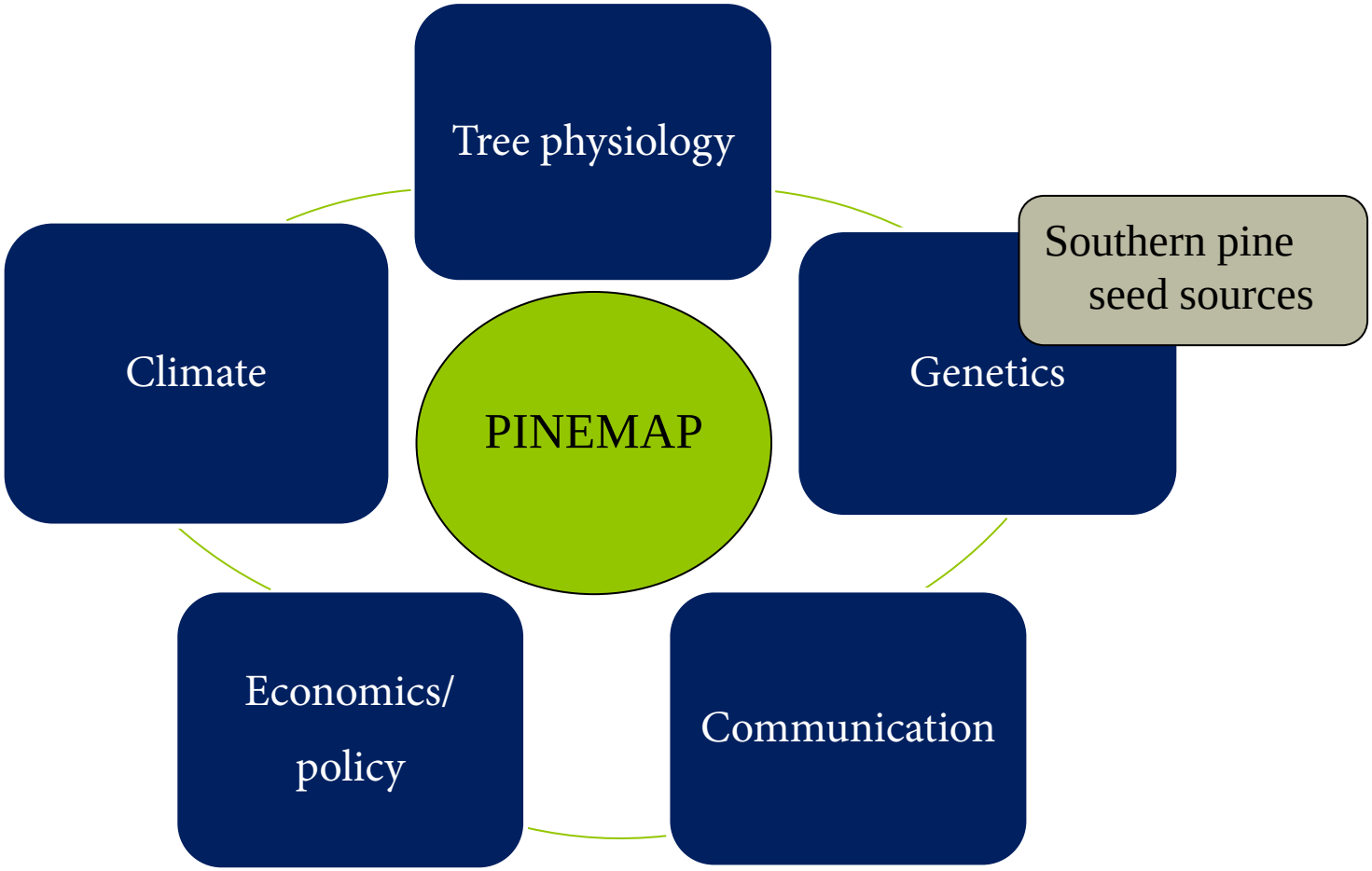

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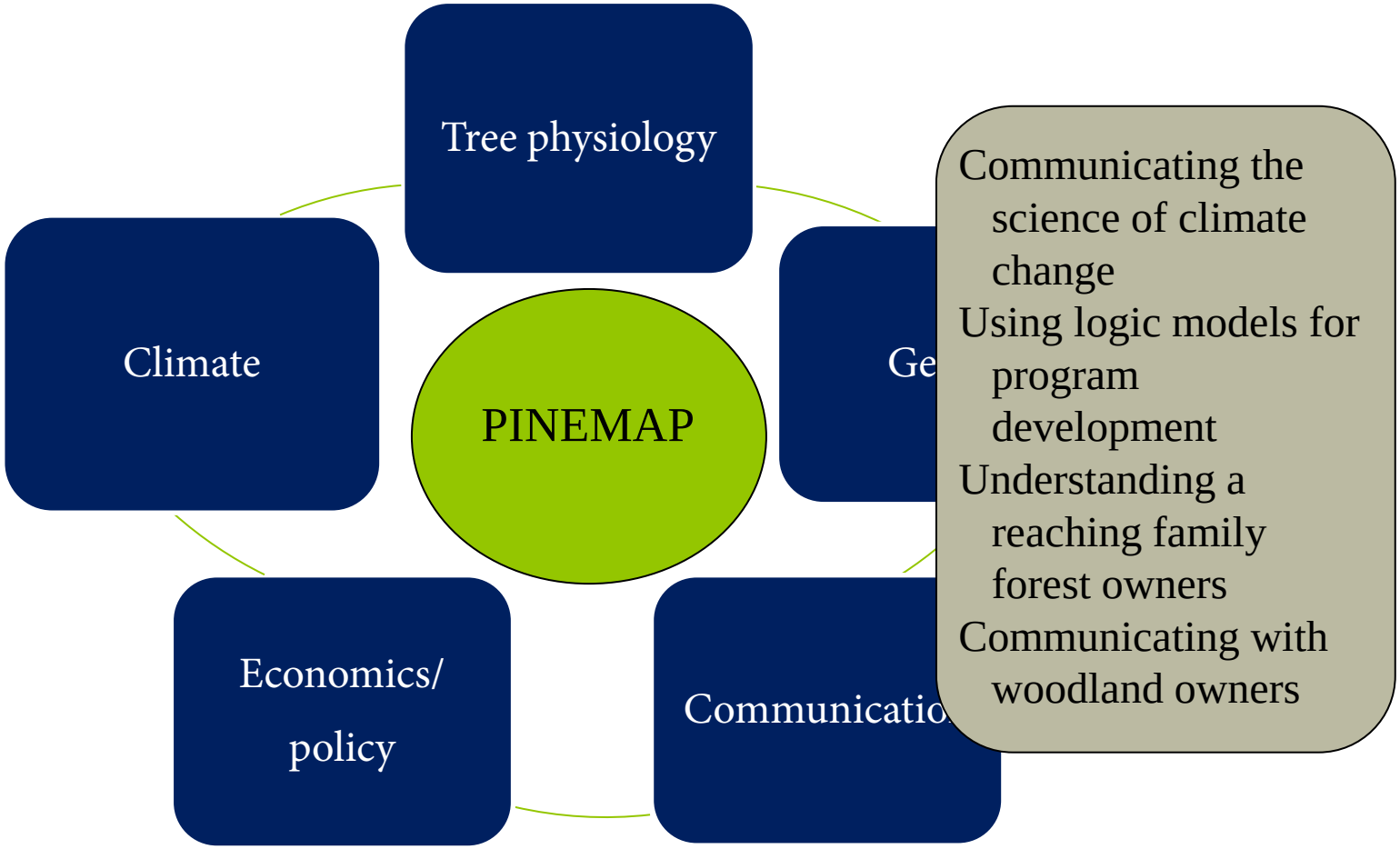

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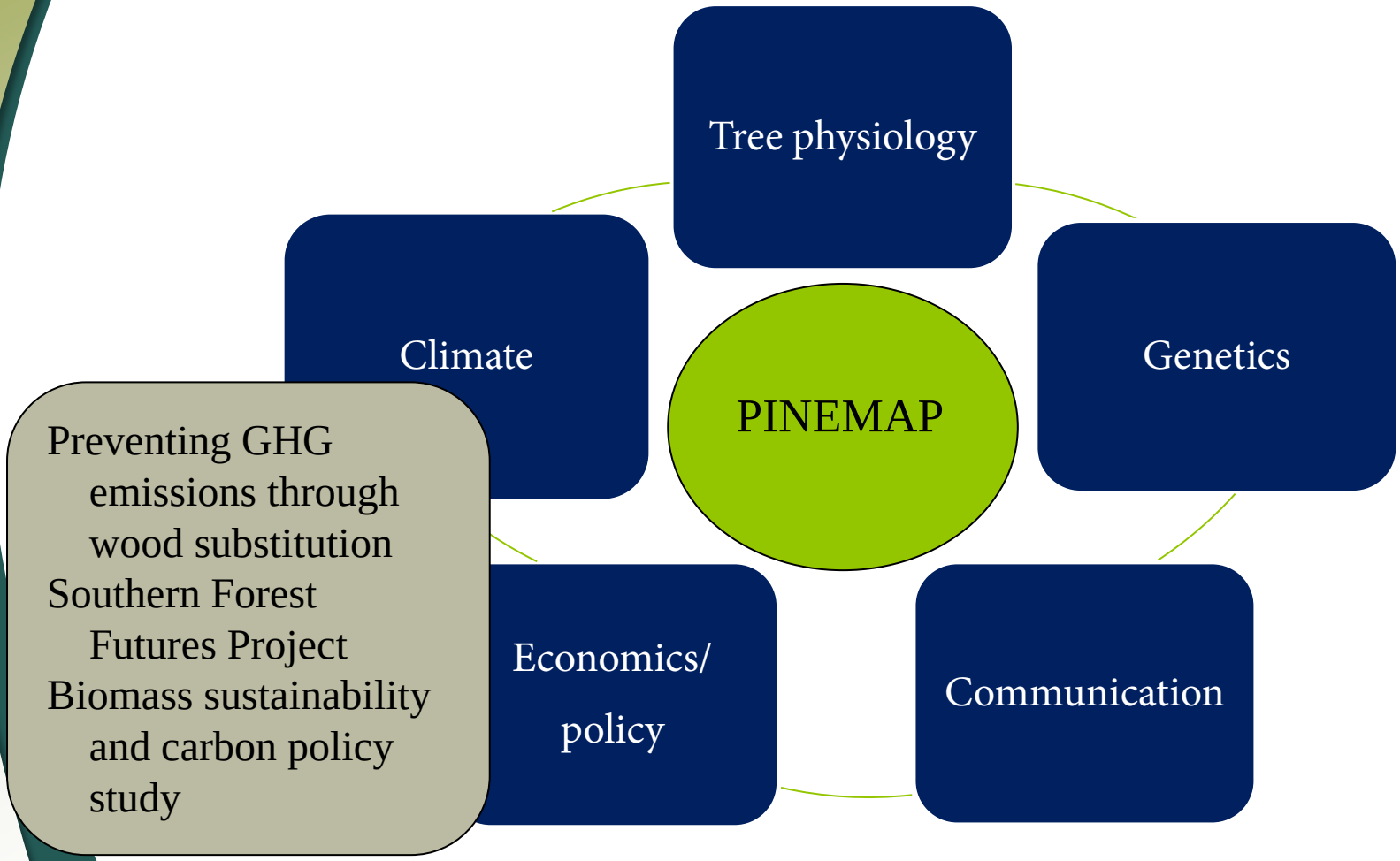
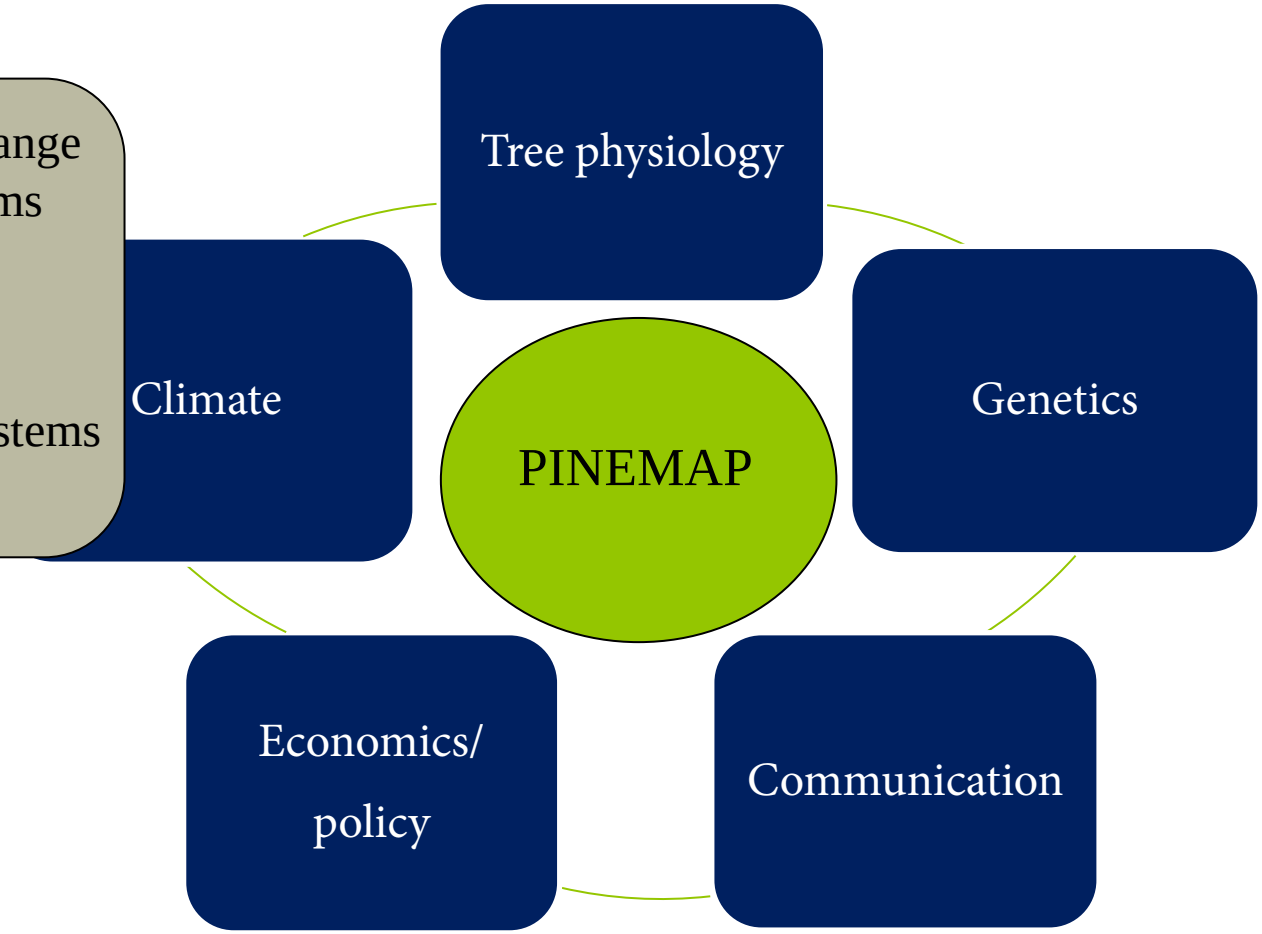


Some Readings

Impact of climate change on forest ecosystems
Climate model projections
IPCC Fact Sheet
Decision Support Systems



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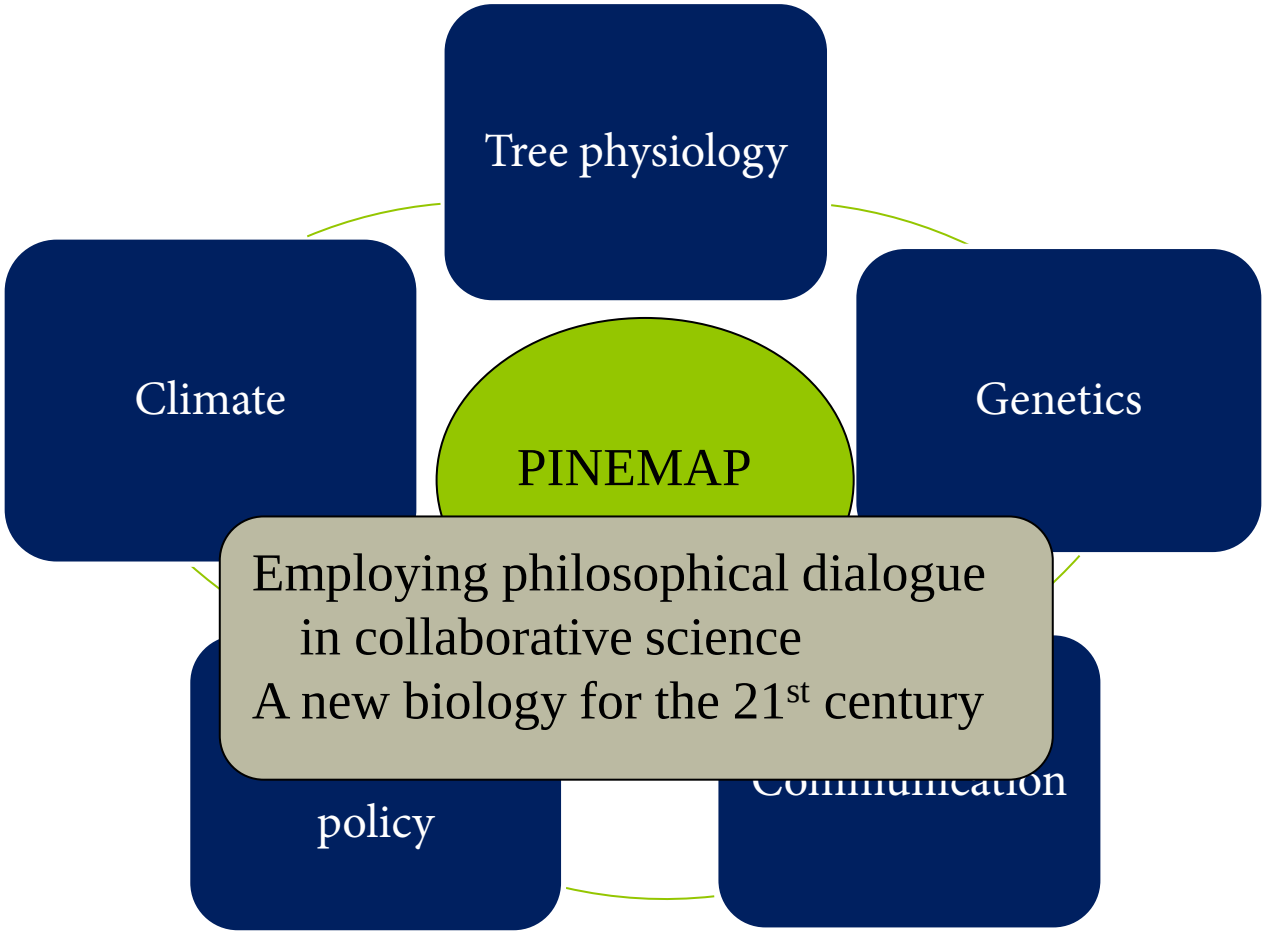
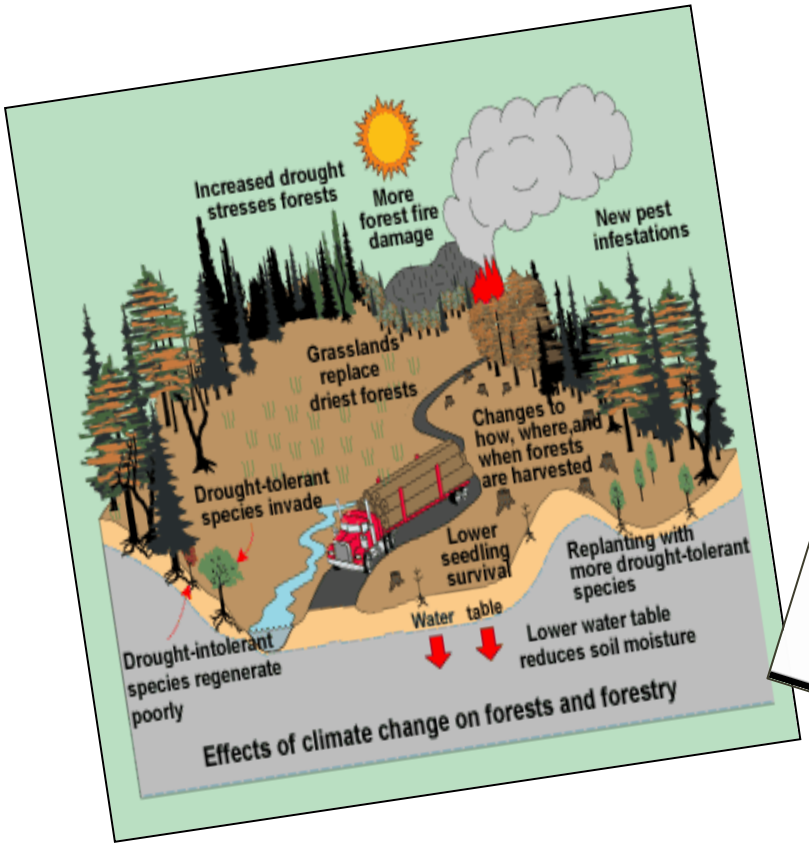


Extension Products



Course Feedback

- Year 1
  - Student evaluations
  - Discussion at annual meeting
- Revision
- Year 2
  - Student evaluations

Team work is hard! Team work with all the people from different schools is even harder. (year 1)

The readings and diversity of speakers are the course's best assets. I learned so much about climate change, forest management, and PINEMAP that wouldn't be covered in a typical course. (year 2)

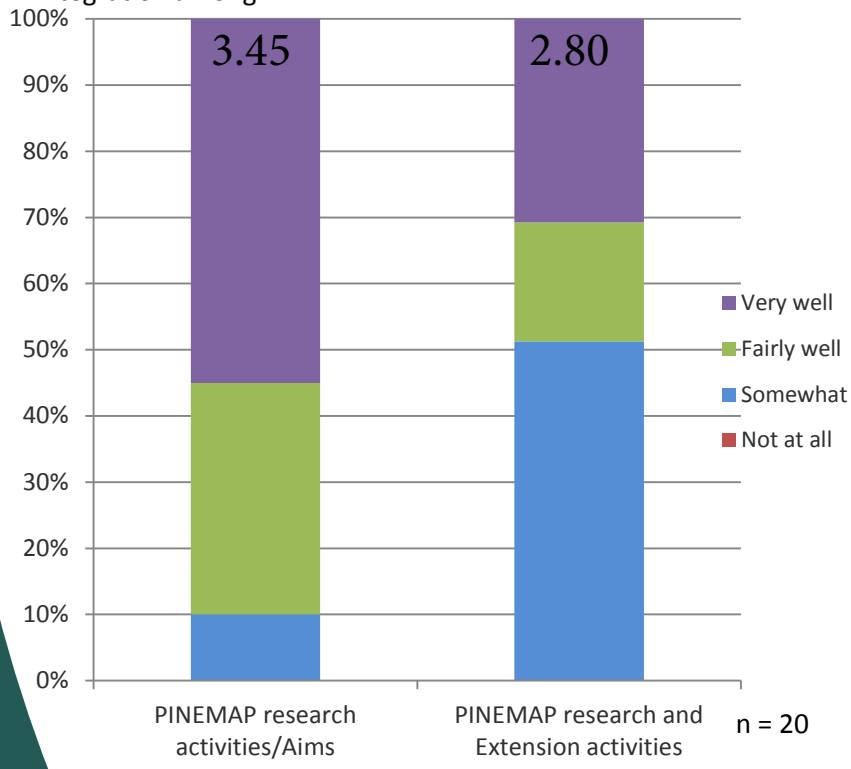
I enjoyed interacting with the other graduate students through the webinars and the assignments. I feel this is where I learned the most about what they are doing and how our aims fit together. (year 1)

I generally liked the online format. In the discussion forum, the format allowed me to consider what my classmates wrote before responding. (year 2)

Student Evaluation – On Integration

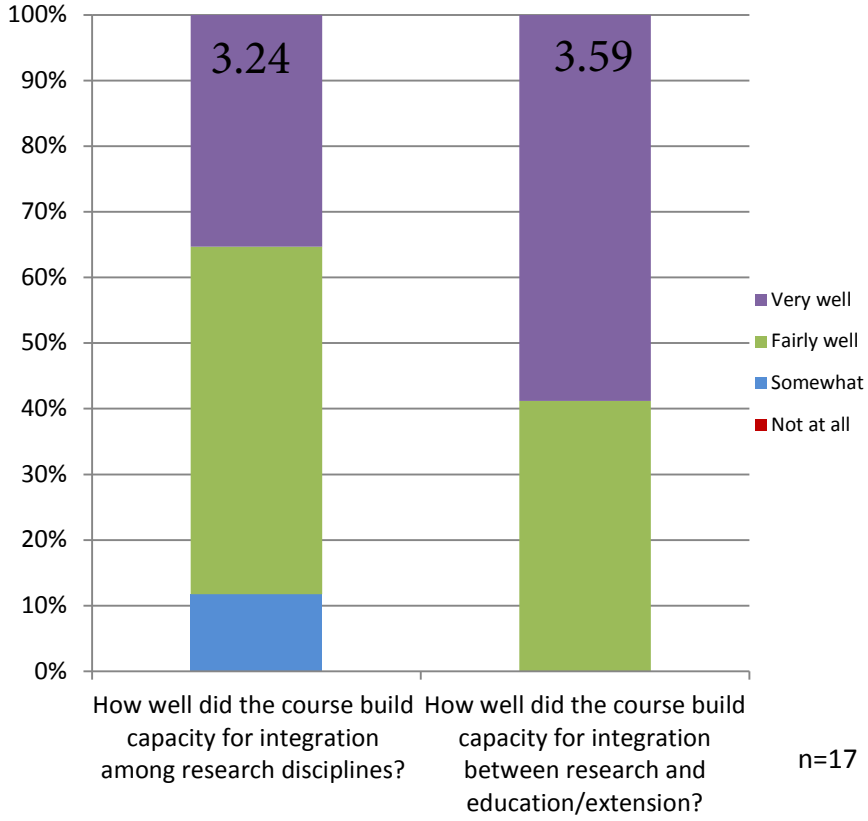
Year 1 (4-point scale)

How well did the course help you better understand integration among:



n = 20

Year 2 (4-point scale)



n=17

More from student evaluations

Year 2 Evaluation Items	Mean (5 pt scale)
As a result of participating in this course, I have a better understanding of PINEMAP objectives and strategies.	4.5
Developing an Extension fact sheet was an effective mechanism for learning about Extension product development.	4.5
The benefits of hearing from professors from several institutions outweighed the challenges of distance learning.	4.4
The course increased my ability to understand PINEMAP research being conducted in other aims.	4.2
The course increased my readiness to conduct or participate in integrated research.	4.1

Benefits of This Course

- Introducing project, faculty, students to each other
- Enabling conversations at annual meeting
  - A common struggle for 41 students!
- Building understanding and relationships across disciplines
- Emphasizing the applied nature of research, the intent for impacts
- Gaining experience in translating research to users
- Planting seeds of integration

And continued with…

- Annual meetings, integration platforms, publications, presentations, etc.

Questions?
Comments?