PINEMAP DSS – Connecting research to decisions
PINEMAP research will connect to users (professional foresters and landowners) through several ways, including the PINEMAP Decision Support System. The DSS is an organized framework to link in existing or new tools to help our audience answer questions about pine planting and management.

Task 1: Each AIM should go through the DSS list of questions and identify *existing or planned tools* and *ongoing or planned research* that will answer these questions. Please keep the following in mind:

- Tools or research do not have to come from PINEMAP – please include any known websites, data, or software that could help answer these questions. We want to take advantage of existing tools.
- Some existing or planned tools will answer multiple questions – please list the tool for each question if it answers multiple questions.
- Some questions will not have tools that provide answers – this is OK. These are opportunities for future research and development.
- Items under "Where do these go?" need to be associated with questions

Please list the following on your AIM team's easel pad *for each question*:
Question:
Tool/research name:
Brief description (few words):
Point of contact: NAME/EMAIL
Existing or Planned?:
URL if existing:

Example:
As you look through the list of questions, you see…
Question 5a. What are special resources I could protect? E.g. water, biodiversity, carbon, cultural resources

Here is an existing tool from our group that could help answer this question...
Question: 5a
Tool/research name: WaSSI
Description: water supply stress index ecosystem services model
Contact: Ge Sun, USFS / gesun@fs.fed.us
Existing or Planned?: PLANNED
URL: http://www.forestthreats.org/research/tools/WaSSI

Task 2: *What questions do you think are missing in each stage?* Please list questions you think are missing, and assign them one (or more) of the decisions.

Example:
What is my risk of total catastrophic loss due to wildfire over the life of my stand?
Fits under: what to plant, density management, vegetation control

PINEMAP DSS list of questions:

Location of Interest:

1. Click the map to identify your location of interest
    a. What is your address; city/county and state; zip code; or lat and lon?
    b. Where is this site in relation to the native loblolly pine range?

2. Goals and Objectives – what is your goal/objective?
    a. How can I maximize fiber production while keeping stand healthy and resilient as well as reducing risk of loss?
    b. How can I maximize carbon sequestration?
    c. How can I most efficiently utilize nitrogen and other fertilizers?

3. Stand Progression – where is your stand in life?

    New Stand
    a. What are the site conditions?
    b. Is it an old pasture? Is it an old ag field? etc.

    Existing Stand
    c. What is the species mix?
    d. What is the age?
    e. What is the density?
    f. Have you done past management? If yes, what type?

    Reclaiming a Stand
    g. TBD

Current and Future Conditions:

4. Current and historical environmental conditions

    Weather and climate:
    a. What is the weather and climate like?
        i. Aim 1: PRISM data at tier sites (Brandon Hoover)
    b. What are the rain patterns including timing of the rain?
        i. Aim 1: PRISM data at tier sites (Brandon Hoover)
    c. What are the temperatures including nighttime temperatures?
        i. Aim 1: PRISM data at tier sites (Brandon Hoover)
    d. What are the seasons – e.g. start and end periods for frost/freezes, growing season, etc.?

    Soils:
    e. What is the suitability of the soil?
        i. NRCS web soils website
    f. Any issues or restrictions, e.g. stays wet and restricts harvesting?
    g. Is this site susceptible to drought?
    h. Is this site susceptible to flooding?
    i. What is the compaction, slope, aspect, and elevation?

    Other environmental conditions:
    j. What are the trade-offs between water and carbon?
        i. Aim 2: WaSSI ecosystem services (Steve McNulty, Ge Sun)

    Markets:
    k. What are the current markets?

    Productivity:
    l. What is the historical growth like? (tons/acre/yr)

i. Aim 1: Data (interpolated legacy, active, and experimental trials) which will be fed into standard code to generate a map and/or time series at a particular location (Brandon Hoover)
ii. Aim 2: Modeling output including 3PG lob (Steve McNulty, Randy Wynne)
iii. NRCS database
iv. FIA database

Other:

m. What are the nearby invasive species?
n. Is there wildfire risk?
o. Are there other pest/disease risks in the area?

5. Possible future pressures

Weather and climate:

a. What might conditions be like?
b. What might the rain patterns be including timing of the rain?
c. What might the temperatures be including nighttime temperatures?
d. What might the seasons be – e.g. start and end periods for frost/freezes, growing season, etc.?

Other environmental conditions:

e. What are carbon sequestration projections?
    i. Aim 2: WaSSI ecosystem services (Steve McNulty)

Markets:

f. What do market projections look like?

Productivity:

g. What will productivity be like if you use current or adapted practices?
    ii. Aim 2: Modeling including 3PG lob (Steve McNulty, Randy Wynne)

Other:

h. What will future invasive species populations look like?
i. What will the future wildfire risk be?

Policy/social:

j. What are the urban sprawl projections?
    i. SALCC Conservation Planning Atlas (http://salcc.databasin.org/datasets/)
k. What are land use change projections?
    i. SALCC Conservation Planning Atlas (http://salcc.databasin.org/datasets/)

Establishment Decisions:

6. Seedling Selection -- What to plant?
    a. What species, family should I plant?
        i. Aim 3: New seed deployment tool (Ross Whetten, Tom Byram)
    b. What stock type should I use? Bareroot or containerized?

7. Density
    a. How many/few should I plant?
    b. Under what conditions should I plant higher density? Lower density?
    c. How does density impact carbon storage? Nitrogen Efficiency? Fiber production?

8. Planting season -- When to plant?
    a. When is the best time of year to plant?

b. How much moisture is needed in the soil?

9. Current Environmental Conditions -- What are the conditions at my site?
    a. Are we in a drought?
        i. Aim 6: Drought Monitor (Heather Dinon Aldridge)
        ii. Aim 6: Drought index data (Heather Dinon Aldridge)
    b. Is there ample moisture in the soil?
        iii. Aim 6: CPC soil moisture values (Heather Dinon Aldridge)
    c. What are the weather conditions (temperature, wind speed, etc.) now and for the next 1-3months?
    d. If I plant in the next 1-3 months, what is the chance of failure and replanting?

10. Site Preparation -- Is the land ready?

    Competition control:
    a. Does competition exist?
    b. How can I control it?
    c. Should I control it?

    Soil nutrition:
    d. Are there nutrient deficiencies?
    e. How can I overcome them?
    f. Should I overcome them?

    Soil physical properties:
    g. Should I perform ripping, disking, bedding, or chopping?

    Regeneration pests:
    h. Are there insects and diseases?
    i. What about gophers and others?
    j. How do I identify these pests?
    k. How can I control them?
    l. Should I control them?

    Other:
    m. Is stand establishment economically sound or use alternatives -- natural regeneration or alternative land use?

11. Planting Tips
    a. What are the differences between mechanical and by hand?
    b. What are the necessary weather conditions?
    c. What are recommended techniques?
    d. What are common mistakes to avoid?

12. Release: post-planting (one to eight yrs)
    a. What do I do if herbicide application is needed?
    b. What do I do if insect problem exists?
    c. What do I do if burning is needed?

Intermediate decisions:

13. Vegetation Management
    a. Is there vegetation that needs to be controlled using herbicides and/or fire?
    b. How can I do this?
    c. Should I control it?
    d. What is the impact of vegetation control to carbon storage? Nitrogen efficiency? Fiber production?

14. Insect and Disease Control

    Insects:
    a. Are there insect(s)?

b. How do I identify them?
c. How can I control them?
d. Should I control them?

Diseases:
e. Are there disease(s)?
f. How do I identify them?
g. How can I control them?
h. Should I control them?

15. Density management -- What is your stand structure?
    a. Should I thin?
    b. Should I burn?
    c. Should I apply herbicides?
    d. What is the impact of these to carbon storage? Nitrogen efficiency? Fiber production?

16. Nutritional Management
    a. Are there nutrient deficiencies?
    b. How can I overcome them?
    c. Should I overcome them?

17. Ecosystem Services
    a. What are special resources that I could protect? e.g. water, biodiversity (wildlife management and conservation of game, endangered/threatened species such as red-cockaded woodpeckers, etc.), carbon, cultural resources, etc.
        i. Aim 2: WaSSI ecosystem services, e.g. carbon sequestration projections; trade-offs between water and carbon (Steve McNulty)
        ii. Aim 4: Trade-offs with ecosystem services such as carbon, timber, and biodiversity including carbon hotspots and forest management drivers (Francisco Escobedo and Nilesh Timilsina)
        iii. Aim 4: Species richness estimates to help with biodiversity conservation decisions (Francisco Escobedo and Nilesh Timilsina)

18. Restoration / Reclamation
    a. Should I restore?
    b. How can I do this?

Regeneration decisions:

19. Harvesting Schedule
    a. When should I harvest?
    b. What is the risk/value associated with harvesting?
    c. Should I perform clearcut or selection?
    d. What do I need to consider with my next stand? e.g. invasives preparation
    e. What is the impact of these to carbon storage? Nitrogen efficiency? Fiber production?

Where do these go?

PINEMAP:
- Aim 2: TACCIMO especially GIS viewer (Steve McNulty)
- Aim 2: 3PG linked with economic analysis (need contact person)
- Aim 2: Growth and yield model results for historical and future climate conditions (need contact person)

Non-PINEMAP:
- NED-2 DSS for ecosystem management (http://www.nrs.fs.fed.us/tools/ned/products/ned2/)
- Forestry*A*Syst (http://www.forestasyst.org/intro.html)
- Seed deployment tool from PNW (http://sst.forestry.oregonstate.edu/PNW/index.html)
- Loblolly Pine Performance Rating System, or PRS (http://ncforestservice.gov/publications/Forestry%20Leaflets/FM12.pdf)