**DRAFT** Minutes from Spatial Analysis Project Technical Team Meeting
8/20/2001
Cloquet Forestry Center
10:00 AM to 3:00 PM

*Attendees*: Bill Befort, Susan Bergman, Josh Bixby, Daren Carlson, Alan Ek, Lee Frelich, Joanne Hanowski, Howard Hoganson, George Host, Tim Jones, Jim Manolis, Smita Mehta, Chad Skally, and Mark White.

Submitted by Daren Carlson and Jim Manolis

Meeting opened with introductions.

**Updates**:

- Jim is now the Project Manager for the Spatial Analysis Project, replacing Chris Edgar. Chris Edgar resigned so he could focus on completing his Ph.D. Jim will continue his Technical Team leader responsibilities, and will dedicate 85% of his time to the project. Daren Carlson will assist with 15% of his time so that a 1 Full Time Equivalent will be dedicated to the project.
- Some Strategy Team members are concerned about the level of Strategy Team Involvement in the project. The last Strategy Team meeting was held in February, 2001. To address this concern, Jim has been communicating with individual Strategy Team members, and Strategy Team meetings are scheduled for September 7 and October 12.

## Synthesis/Interpretation Component of the Project

Jim reviewed a proposal outline of this project component discussed at the May 1, 2001 technical team meeting (available at http://www.frc.state.mn.us/Spatial/minutes/PSTMin050101.pdf) ). The purpose of this component is to synthesize findings from all the study components, and interpret the implications of the findings. Other project components measure past, current, and potential future spatial patterns in MN forests, but do not evaluate what these patterns or changes in patterns mean for wildlife and ecological processes. The basic components of the May 1 outline are:

1) A background paper describing current knowledge and conceptual models of how species and processes respond to changes in spatial patterns, and
2) Interpretation of spatial analysis project results using this background paper as a foundation.

The outline notes that conceptual models developed in the background paper can be used to develop quantitative, computer models of species response if sufficient funding is obtained or in collaboration with other efforts. The technical team felt that the funds available at the time were not sufficient for a multi-species modeling effort that incorporates spatial patterns.

The May 1 outline circulated to the Strategy Team, the FRC and others. Several Strategy team and Landscape Committee Members felt that quantitative species models are critically important for evaluating wildlife implications of the future scenario models. They suggested that we evaluate options for quantitative wildlife (flora and fauna) modeling, and raise additional funds if necessary. The FRC has additional funds available (up to $50,000, most likely to be split among several projects), and will discuss proposals for use of the funds at their Sept. 25 meeting. The technical team needs to prepare a proposal to discuss with the Strategy Team on Sept. 7. The Aug. 20 discussion focused on developing this proposal, and the following presentations were used as background for the discussion:

**Some ideas and progress towards a MN Forest – Wildlife model, Alan Ek, U of MN**
Alan Ek presented his thoughts and some specifics about his vision and steps toward a comprehensive Forest – Wildlife modeling effort in MN (his handout is attached in a separate document). Key points from his presentation:

- Comprehensive wildlife models (covering many species), linked to forest vegetation or timber models, are very important to forestry professionals. Such models can be used to explore the impacts of different management scenarios and/ or as a diagnostic tool for land owners/managers.
- We currently do not have a comprehensive model or model framework available for such purposes; some states (California) and Nordic countries have developed user-friendly, mulit-species models.
- GEIS wildlife models were typically simple models based on averages and can be used as a base to incorporate better information and more sophisticated functions.
- Al Ek's group has started some literature review and has an Excel spreadsheet containing some of the GEIS wildlife models and other information.
- Collaboration among many partners is critical for quality and credibility (e.g, DNR Forestry, Wildlife, Ecological Services, U of MN college of Natural Resources, NRRI, USDA forest Service, Fish and Wildlife Service, USGS Fish and Wildlife Cooperative).

**Modeling efforts of forest bird abundance, Tim Jones, NRRI**
Tim Jones presented results from trend analysis and modeling of the Minnesota Forest Bird Diversity Initiatiative. An electronic copy of his presentation is provided as an additional attachment. Main points from his presentation and discussion:

- In preliminary analyses, 10 years of breeding bird survey data were compared to the GEIS bird model predictions for year 50 of the model runs. For 48% of the species that showed significant increases or decreases in the bird survey data, the direction of the trend (increase or decrease) was correctly predicted by the GEIS model. A more thorough analysis will compare predictions for all species (including species that did not have significant trends in the survey data).
- This preliminary analysis suggests poor predictive power of the GEIS bird models. If confirmed with additional analysis, the results could be due to a number of factors: 1) Harvest level and resulting habitat acreage predictions were incorrect in the areas where birds were surveyed (Howard Hoganson said that the Chippewa Nat. Forest's harvesting levels have been much lower than the lowest levels predicted from the GEIS). 2) Species-habitat relationships and population response was poorly defined in the original models. 3) The trends observed over a 10 year period do not reflect the actual trends that will be observed in 50 years.
- The Forest Bird Diversity Initiative has developed new models based on data collected over 10 years. One set of models works like the original GEIS model, but instead of using mean counts in different habitat types, it uses probability of observing different numbers of birds based on observed data. These models were tested with independent data sets (9 sites), and correlation between observed and predicted values was > 0.75 for most sites, but was as low as 0.55 and 0.60 for two sites. Tim stressed that the main importance of this comparison is that using mean bird abundance values for modeling may not be appropriate, and that data collected in the past 10 years can improve model performance.
- As part of the Forest Bird Diversity Initiative, Tim has also developed a set of statistical models that use landscape variables (patch size, edge, contagion etc.) at several scales to predict bird presence or

absence. He has achieved classification accuracy of up to 80% for some bird species. He has sufficient data to develop these models for approximately 40 bird species.

**Forest health and sustainability, SUSTAIN model, JoAnne Hanowski, NRRI**
JoAnn presented the SUSTAIN model and a copy of her presentation is attached. Additional information is available at **http://www.nrri.umn.edu/sustain/**.

- The SUSTAIN project is developing forest and water resources sustainability indicators and management planning software.
- The project defines sustainability as "Having enough healthy sites/stands in the landscape to perpetuate ecological condition and/or populations." Ecological conditions or populations are considered sustainable if they fall within the range of natural variability.
- The model will assess how different short and long-term management objectives affect birds, plant communities, amphibians, and watershed metrics.
- Model output stresses whether indicators are within the range of natural variability.

**Discussion and Proposal**
The team discussed differences in the approaches described. Jim Manolis stressed that our project needs to focus on linking species models to the output from the LANDIS and Howard Hoganson's models, and evaluate the impacts of changes in spatial patterns where those models are applied for the current project. The team agreed to the following basic proposal for the Synthesis/Interpretation Component of the project:

1) Keep the background paper component as discussed at the May 1 meeting.

2) Use several approaches to model wildlife responses to ouput from Landis and Harvest scheduling scenarios. For species where better information or methods are not available, use the original GEIS approach. Where available, use newer models (e.g. NRRI landscape bird models for approximately 40 species) that incorporate more spatial variables.

The team did not resolve whether the different models should be pulled together into a common, user-friendly interface (or whether this is possible). This and further details will be discussed at the Sept. 7 Strategy Team meeting and the Next Technical Team meeting.

## Questions about Landsat Spatial Analysis
Mark White and George Host presented a set of questions about the classification to be used for the spatial analysis of the Landsat images.

- Mark and George provided a scheme that collapsed the classification levels in the Wolter and GAP classifications to match each other and the aerial photo classifications as closely as possible. Participants agreed that the classification of coverages derived from LANDSAT and air photos should be as similar as possible so that comparisons can be made. The team briefly discussed the possibility of maintaining more detail in the LANDSAT classifications where possible, but then decided against this because it would add to the time and complexity of the analysis.
- Mark asked weather the filtering procedure used for the GAP classification should also be used with the Wolter classification. The team agreed that it should to keep the classifications as comparable as possible. DNR's resource assessment shop will provide the filtering algorithms to Mark and George.

- Participants asked whether the LANDSAT classifications should be filtered or smoothed to match the 10 acre minimum mapping unit (MMU) of the Aerial photo interpretation). There would be some advantages to this, but at this time the team is uncertain whether it is possible or worth the effort.
- Mark White wondered if oak should be added as a vegetation type in the aerial photo classification. Bill Befort said oak would be very difficult to identify, especially for mixed species and in the older photos. It was agreed that oak savannah could be inferred based on existing cover type classes, geographic location, and crown closure classes and people agreed that oak should not be added as a cover type class.
- George Host asked whether we should analyze contrast-weighted edge density. George Host said that contrasts weights differ depending on how different species respond to edges, and Tim Jones has found the value of this metric to be strongly correlated with edge length density, and they suggested that this metric may not be necessary to use. Others felt that there are significant contrasts, such as forested/non-forested that should be given weight. Several have created edge weighting matrices and it was decided to discuss this in more detail at a future meeting.

## Harvest scheduling models, Howard Hoganson

Howard Hoganson presented some details of his spatial harvest scheduling model. He also provided a list of 27 modeling scenarios and a highlight of the discussion of those scenarios follows:

- Definitions of interior space and forest edge are needed—these will be discussed at a future meeting.
- The modeling scenarios are not directly comparable to the scenarios defined for the LANDIS model.
- Howard asked about data availability. State, county and federal data is available from the common format data and Chad Skally said that the new common format data lists the top 3 tree species in addition to cover type. Availability of private landowner information is limited and the technical team needs to further discuss options for modeling vegetation change on private lands.

## LANDIS model

- Smita Mehta has obtained the newest version of the LANDIS model, including the timber harvest module.
- Tim Jones will send test data to Smita ASAP, so they can begin to test how to run the proposed scenarios.
- Tim Jones, Smita Mehta, and Lee Frelich will conduct test model runs and propose ranges of variables (e.g., size of clearcuts, rotation ages etc) that will be used in scenario runs.

## Aerial Photo Interpretation

J. W. Sewall sent us an interpreted coverage (1990's photos) for one of the air photo sites. This has been distributed to the technical team via email and team members will provide comments to Jim so he discuss them with the interpreters.

## Next meetings

Jim Manolis has contacted Technical Team members with potential dates for meetings over the next 3 months. Jim will confirm these dates via email.