



How to make a Great Poster

Dr. Lisa White

lwhite@sfsu.edu

Associate Dean

College of Science and Engineering

San Francisco State University

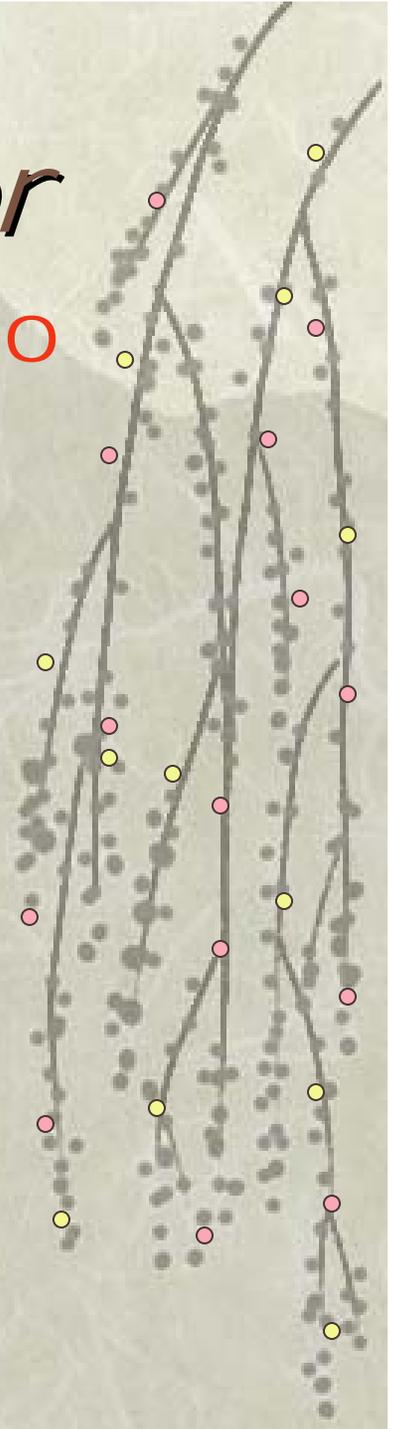
Purpose of a Poster

To communicate/publicize to others your

- research/experiment results
- study reports
- project outcomes
- organization features
- business plans

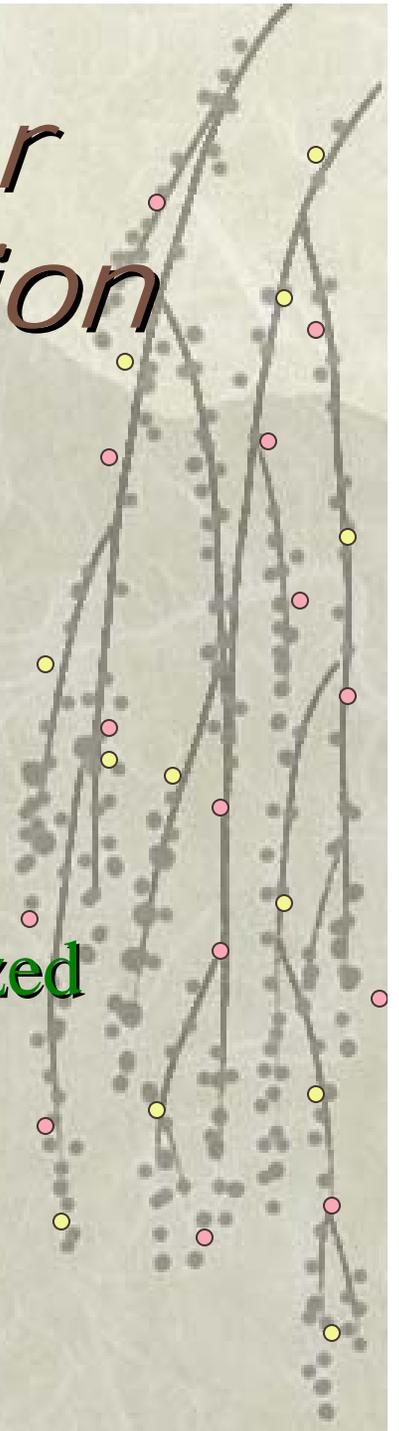
in a way that is

- clear
- effective



Effective and Clear Visual Communication

- Is able to catch as many viewers' attention as possible
- Is pleasing to the eye
- Is able to capture viewers' interest in less than 15 secs
- Is readable, succinct, and well organized
- Is informative
- Is legible from 3-6 feet
- Is a conversation starter



Types of Posters

Horizontal and vertical and panels

Multiple vertical panels

**Using a Windbreak Habitat Model Across Broad Landscapes:
The Effect of Local Landscape Composition and Geographic Location**
George Hess¹, John Poulsen², Raymond O'Connor², Jeff Bay³

1. Windbreaks as Habitat
Agriculture has... (text describing the impact of windbreaks on agriculture and the environment)

2. Regional Evaluation of Windbreaks
The Environmental Monitoring and Assessment Program... (text describing the regional evaluation of windbreaks)

3. Bird Species Richness Index
We used the U.S. Fish and Wildlife Service's Bird Species Richness Index (BSRI)... (text describing the BSRI and its application)

4. Validating BSRI Model
In 2005, three of five windbreaks... (text describing the validation of the BSRI model)

5. Results of Validation
The model... (text describing the results of the validation)

6. Failure of the Model
This research... (text describing the failure of the model)

7. Local Landscape-Scale Effects
Local effects... (text describing local landscape-scale effects)

8. Conclusions
1) The Bird Species Richness Index... (text describing the conclusions)

Nebraska's Agricultural Landscape
Map showing the distribution of windbreaks in Nebraska.

Bird Species Richness Index
Graph showing the relationship between the number of species and the BSRI.

Number of species observed vs. Number Predicted by Model
Scatter plot comparing observed vs. predicted species richness.

Acknowledgments
This work... (text describing the acknowledgments)

References
1. North Carolina State University...
2. University of Maine...
3. North Carolina State University...

Poster 269
EFFECTS OF LAND USE AND WETLANDS ON SURFACE-WATER CHEMISTRY

THE PROBLEM
The problem... (text describing the problem)

THE OBJECTIVE
The objective... (text describing the objective)

STUDY AREAS AND DATA SOURCES
The study areas... (text describing the study areas and data sources)

NORTHEAST REGION RESULTS
Principal Component Analysis... (text describing the results for the Northeast region)

SOUTHERN BLUE RIDGE RESULTS
Principal Component Analysis... (text describing the results for the Southern Blue Ridge region)

REGIONAL COMPARISONS
Regional comparisons... (text describing the regional comparisons)

KNOWN RELATIONSHIPS
Known relationships... (text describing known relationships)

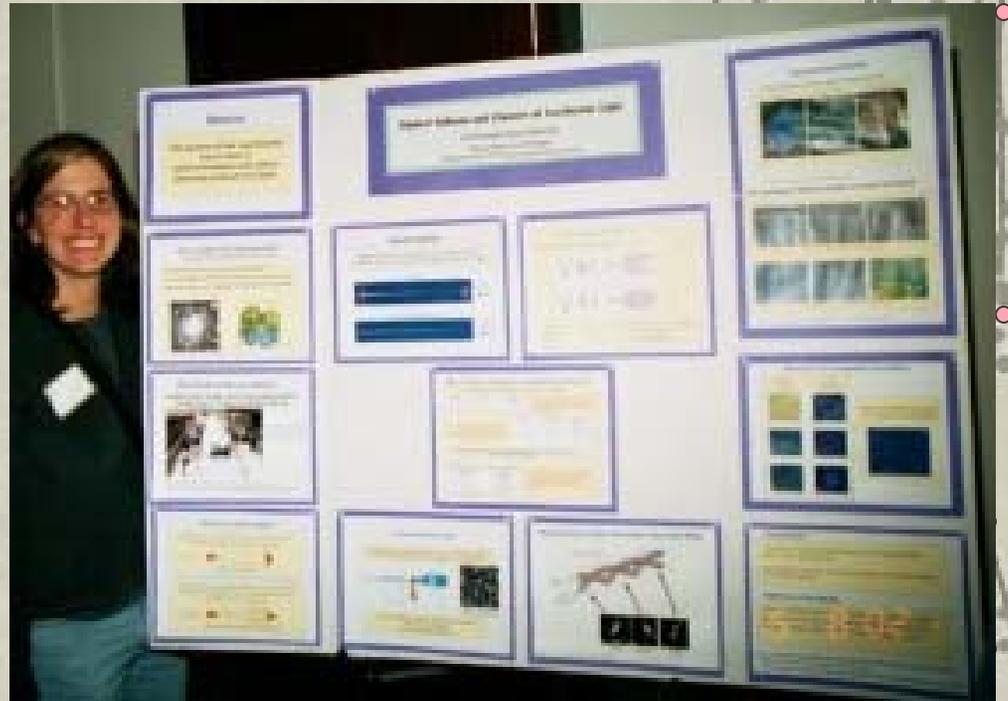
STATISTICAL METHODS
Statistical methods... (text describing the statistical methods used)

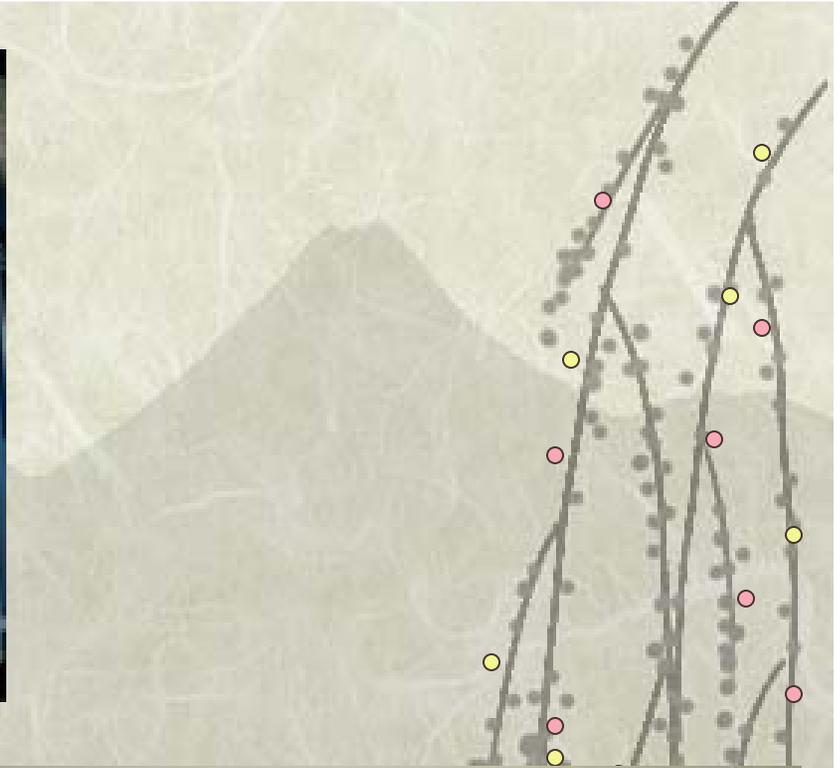
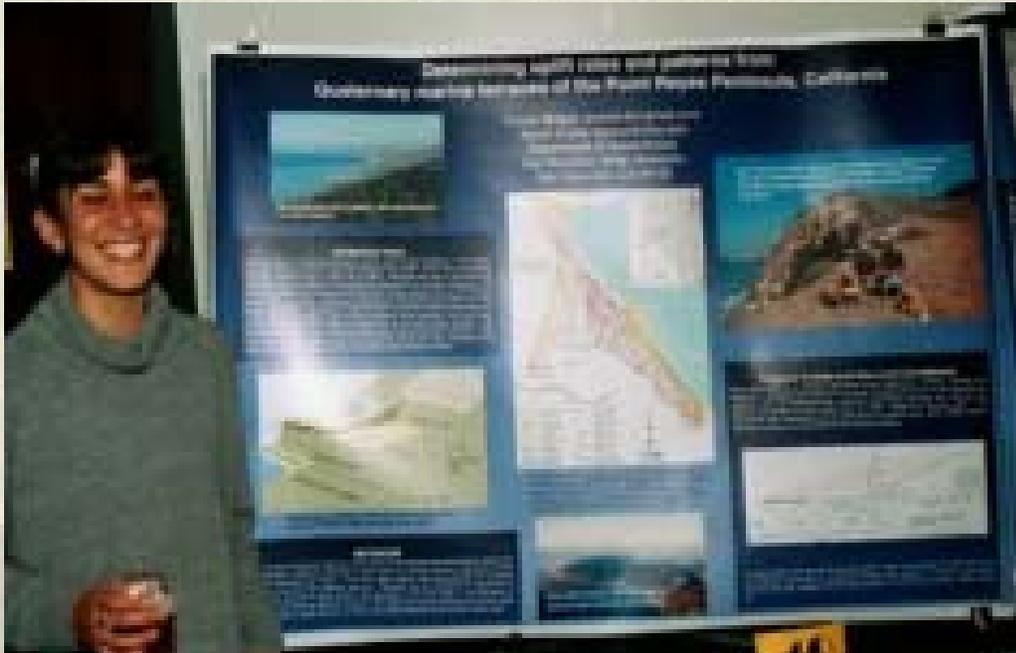
REGRESSION RESULTS
Regression results... (text describing the regression results)

CONCLUSIONS
Conclusions... (text describing the conclusions)



Types of Posters





Types of Posters



Using a Windbreak Habitat Model Across Broad Landscapes: The Effect of Local Landscape Composition and Geographic Location

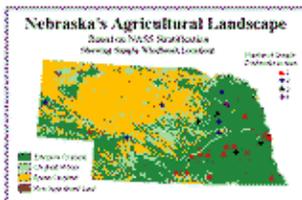
George Hess¹, John Poulsen², Raymond O'Connor², Jeff Bay³

1. Windbreaks as Habitat

Agricultural lands — fields, pastures, and orchards — are managed to produce food and fiber for people. In the U.S., Great Plains, extensive agricultural landscapes, windbreaks have been planted to prevent field, crop, livestock, and forest soils from the prevailing winds. Windbreaks provide some of the energy needed to filter the birds and other wildlife that people have come to value. Windbreaks cover about 20% of the wooded acre in Nebraska, part of the later woodlot cover surrounding riparian corridors.

Although they provide soil from wind erosion and provide habitat for some birds, windbreaks also contribute to the degradation of wildlife populations. These degradation negatively impacts grassland wildlife such as greater prairie chickens, sharp-shinned hawks, and prairie falcons.

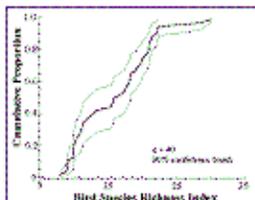
- ★ Forty windbreaks were sampled using two-stage sampling with a frame stratified by intensity of cultivation.
- ★ Most sample windbreaks fell in or near corn-soybean cropland.
- ★ Habitat characteristics of each windbreak were measured in 1994.
- ★ Thirty-five farmers allowed ornithologists to return in 2008.



2. Regional Evaluation of Windbreaks

The Environmental Monitoring and Assessment Program's Agricultural Lands Group — changed rank spacing the stratified outline of U.S. agricultural lands — conducted a pilot study to evaluate the habitat value of windbreaks in a regional land. We looked to one of bird species richness index to measure the habitat value of individual windbreaks.

We selected a random sample of 40 windbreaks in Nebraska, based on a sampling scheme on a USDA National Agricultural Statistics Service agricultural survey. In July 1994, field crews reported attributes of 40 windbreaks from that of the 1994 national survey. The data were used to evaluate the value of windbreaks in breeding bird habitat in Nebraska.



3. Bird Species Richness Index

We used the U.S. Park and Wildlife Service Bird Species Richness Index (BSRI) which estimates the number of breeding bird species a single windbreak can support based on four windbreak attributes.

- ★ Area on the eastern (downwind) side of the windbreak supports more species. Area was measured by satellite mapping.
- ★ Height: Taller windbreaks provide more niches. Height was measured by photographic analysis.
- ★ Vertical Structure: A more structurally complex windbreak provides more habitat niches, measured by photographic analysis.
- ★ Shape: provides another habitat niche. Shape was measured.

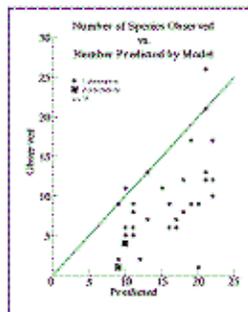
- ★ Using equations factors associated with each sample, we estimated the habitat value of windbreaks for the region (graph left).
- ★ We estimated that half of Nebraska's windbreaks support more than 10 breeding bird species (graph left).
- ★ We also estimated that between 87% and 100% of windbreaks are smaller than 1.5 hectares (data not shown), suggesting that few Nebraska windbreaks provide habitat for those larger or area sensitive birds.

4. Validating BSRI Model

In 1995, a team of five ornithologists visited 35 of the 40 windbreaks 15 years after their initial survey, for May and early July.

Each windbreak was visited four times. Data were collected between one-half hour before and one hour after sunrise. All observed birds were identified to species and recorded using spot sampling techniques. This included observations of the eastern meadow-lark were not reported for five years through the windbreak for each visit.

During the windbreaks were visited, we counted all species seen observed.



5. Results of Validation

The model overestimated the number of bird species in the Nebraska windbreaks (graph left). However, the relative qualitative ranking of windbreaks is generally preserved. A total of 28 species were observed.

No strong, significant relationship was found between densities of observed from predicted number of species and any individual attribute or the geographic location of individual windbreaks.

Forest species, song sparrows, and forest edge species occurred in the larger, taller, more complex windbreaks.

Open field and grassland species occurred in the smaller, shorter, less complex windbreaks.

6. Failure of the Model

There are several possible explanations for the failure of the model to predict accurately the number of bird species in the windbreaks.

- 1) Geographic differences in species richness. The model was developed in Kansas, which has 5.8 million hectares of land. Nebraska's (including land there's) species richness may be North American.
- 2) Dependence on different landscape characteristics. The number of species in windbreaks may be more dependent on landscape characteristics than did the number of species in Kansas.
- 3) Dependence on landscape-scale characteristics. The number of species in Nebraska's windbreaks depend on characteristics of the surrounding landscape.

7. Local Landscape-Scale Effects

Local over time were collected for the quarter-century 1990 survey of 40 windbreaks in the region. Over a region, four main windbreak crop, corn, soybean, forest, and pasture, and other crops and other groups were also recorded (graph 1 shown).

Landscape metrics composed of patch, matrix cover, distribution, and edge length, edge area ratio, number of patches, patch patch size, mean perimeter per patch, and size of largest field.

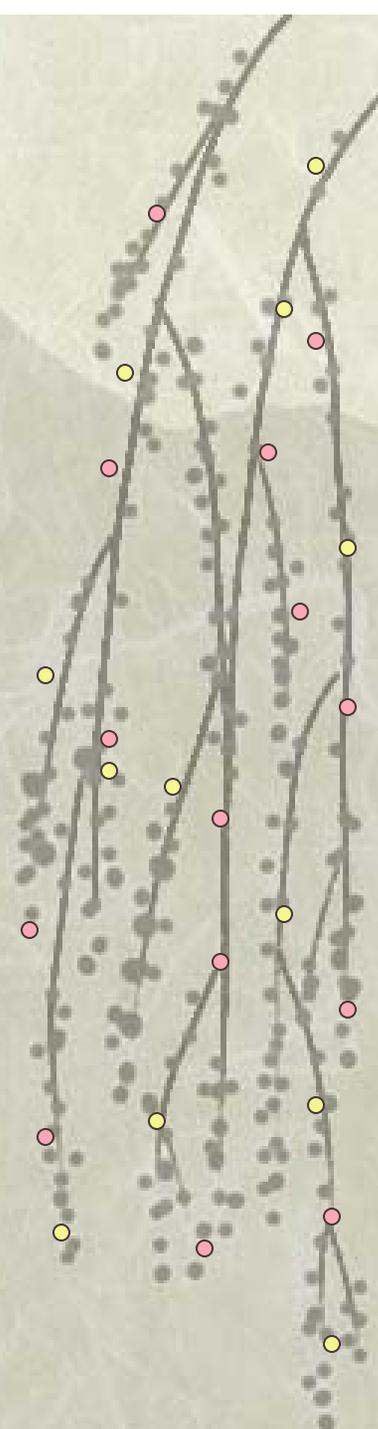
The distribution between observed and predicted number of species was not significantly related to any of the landscape metrics. This suggests that while it reports the number of species using a windbreak, degree patch size by windbreak attributes.

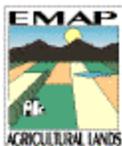
8. Conclusions

- 1) The Bird Species Richness Index for windbreaks cannot be considered solely to describe species richness at large regional scales without other variables regarding property or other factors that account for differences in regional species pools.
- 2) Local landscape-scale characteristics and structure do not explain the failure of the model.
- 3) The presence of species pools in windbreaks (e.g., forest interior specialists) may be explained by windbreak size and complexity. The model was to some extent for predicting the presence or absence of species pools than for predicting the total number of species present.

Acknowledgments This work could not have been done without the many dedicated people at the National Agricultural Statistics Service who helped plan and execute the 1994 data collection effort: the field farmers who allowed us to survey their windbreaks; the five ornithologists who spent six weeks traveling around Nebraska; and many other people from the University of Nebraska, U.S. Fish and Wildlife Service, National Resources Conservation Service, and the Environmental Protection Agency. Funding was provided by the Environmental Protection Agency and the USDA Agricultural Research Service.

1. North Carolina State University, Forestry Department, Raleigh, NC
2. University of Maine, Department of Wildlife Ecology, Orono, ME
3. North Carolina State University, Sociology Department, Raleigh, NC





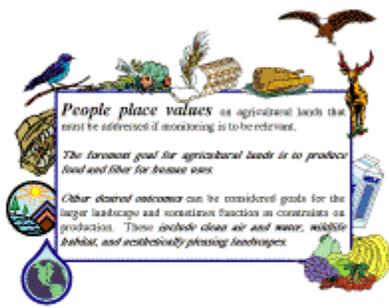
A Framework for Assessing the Condition of Agricultural Lands

George Hess¹, Anne Hellkamp², Mike Munster³, Steve Peck³, Lee Campbell³, Betty McQuaid⁴, Steve Shafer^{3,5}

Mission: To develop indicators of the condition of agricultural lands within an ecological framework, and to monitor and evaluate this condition on a regional basis.



Sustainable agriculture has been discussed, defined, and discussed in countless papers. Definitions tend to be broad and encompass ecological, economic, social, and even policy dimensions. Although these dimensions are interrelated, each may be measured independently. In our efforts, we sought methods to examine only the ecological aspect of sustainability.



People place values on agricultural lands that must be addressed if monitoring is to be relevant. The foremost goal for agricultural lands is to produce food and fiber for human uses. Other desired outcomes can be considered goals for the larger landscape and sometimes function as constraints on production. These include clean air and water, wildlife habitat, and aesthetically pleasing landscapes.

The ecological condition of agricultural land is defined by its productivity and the degree to which valued biotic and abiotic resources are conserved and protected. Agricultural land in good condition is productive and does not compromise valued resources. Sustainability is the ability to maintain good condition over time.

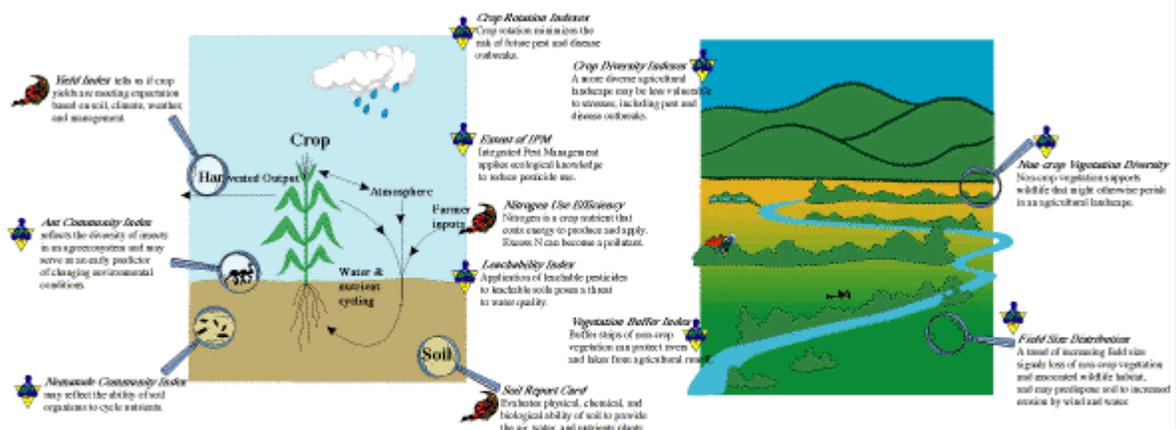


Indicators were selected to reflect crop productivity and land stewardship. In making an assessment, condition is reported for each indicator. An overall condition may also be reported, but depends critically on the relative weighting of the goals for agricultural lands. For sustainability, one can monitor trends in crop productivity and stewardship practices.

Potential Indicators for Annually Harvested Herbaceous Cropland

As a starting point, we chose to concentrate our efforts on developing indicators for **annually harvested herbaceous cropland** — land planted with crops that are harvested every year whether the plants are annual or perennial. Common examples are corn, wheat, soybeans, alfalfa hay, and strawberries.

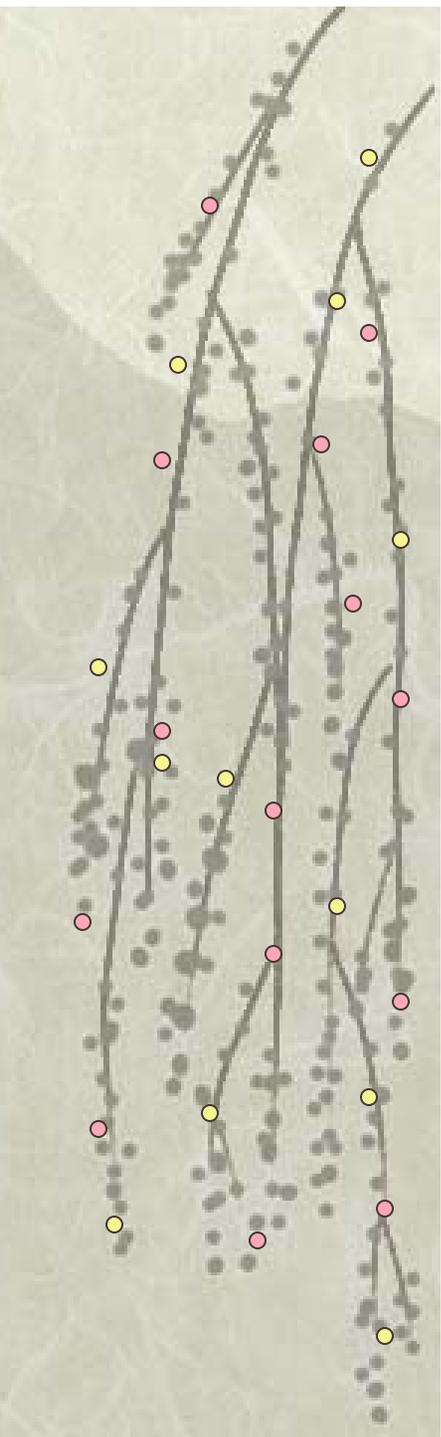
We also endeavored to supplement, rather than duplicate, existing efforts. Our conceptual framework is flexible enough to incorporate indicators based on data from other monitoring efforts. For example, an erosion indicator could be developed using the USDA Natural Resources Conservation Service's Natural Resource Inventory data.



Fields are for crops . . . but landscapes are for all of us.

Acknowledgements: The EMAP Agricultural Lands Baseline Group thanks the many individuals and organizations that made this effort a success. The individuals are too numerous to mention, but organizations include the USDA's Agricultural Research Service, Forest Service, National Agricultural Statistics Service, and Natural Resources Conservation Service; the U.S. Environmental Protection Agency; North Carolina State University; University of Maine; Oregon State University; University of Nebraska; and, well, I guess the list of organizations is pretty long, too. Thanks to all!!!

1. North Carolina State University, Forestry Department, Raleigh NC
2. Duke University Medical Center, Durham NC
3. North Carolina State University, Department of Plant Pathology, Raleigh NC
4. USDA Natural Resources Conservation Service, Raleigh NC
5. USDA Agricultural Research Service, Raleigh NC



Three Panel Poster is Most Common

EFFECT OF HEMODIALYSIS ON HEMOSTATIC PLATELET FUNCTION IN UREMIC PATIENTS

Sharad C. Mathur, M.D.¹, Jonathan L. Miller, M.D., Ph.D.¹, Sriram S. Narsipur, M.D.²
 Departments of Pathology¹ and Medicine², SUNY Upstate Medical University, Syracuse, NY

Introduction

Anemia and platelet dysfunction are major contributors to the hemorrhagic diathesis seen in patients with end-stage renal disease (ESRD). Following hemodialysis, there is frequently a clinical improvement in bleeding. However, such clinical improvement is not typically accompanied by any consistent change using standard clotting assays. Evaluation of platelet function has shown a decrease in platelet membrane glycoprotein (GP) IIb and a functional improvement in GP IIb/IIIa following hemodialysis. Currently used laboratory tests separate the elements of primary hemostasis (platelet response) from secondary hemostasis (coagulation cascade) and therefore are not sensitive to the effect of platelet procoagulant activity and platelet microparticle formation. We evaluated the effect of hemodialysis on coagulation using a new laboratory instrument, the Clot Signature Analyzer (CSA) (Kylun Corporation, Scarsdale, NY).

Methods

Blood was collected before and immediately following hemodialysis in ten patients with ESRD. Platelet GP IIb function was analyzed by platelet aggregation in response to incremental concentrations of ristocetin. Hemostatic function was further evaluated by the CSA instrument. This instrument uses a continuous flow system to determine the time to platelet plug formation and platelet-dependent fibrin clot formation for non-anticoagulated whole blood. Whole blood flows through a tube that is punctured by a needle to cause a sudden increase in shear stress and activation of hemostatic pathways (Figure 1). Because it uses non-anticoagulated whole blood, this system is sensitive to platelet procoagulant function and platelet microparticle formation. Statistical significance was assessed using a two-tailed student's t-test for paired data. Differences in pre-dialysis and post-dialysis values were considered significant at $p < 0.05$.

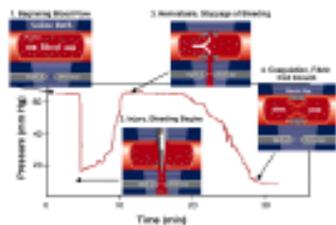


Fig 1
 The Clot Signature Analyzer (CSA) instrument uses a continuous flow system to determine the time to platelet plug formation and platelet-dependent fibrin clot formation for non-anticoagulated whole blood. Whole blood flows through a tube that is punctured by a needle to cause a sudden increase in shear stress and activation of hemostatic pathways (Figure 1). Because it uses non-anticoagulated whole blood, this system is sensitive to platelet procoagulant function and platelet microparticle formation. Statistical significance was assessed using a two-tailed student's t-test for paired data. Differences in pre-dialysis and post-dialysis values were considered significant at $p < 0.05$.

Results

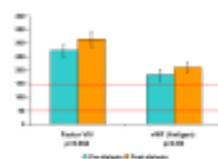


Fig 2
 Levels of platelet aggregation were significantly increased following hemodialysis. The red bars indicate the pre-dialysis values.

Screening tests of secondary hemostasis (prothrombin time, partial thromboplastin time, and thrombin time) were not significantly different following dialysis. Post-dialysis values of factor VIII and von Willebrand factor were significantly higher than pre-dialysis values (Figure 3).

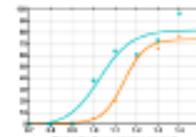


Fig 3
 Platelet aggregation in response to ristocetin to determine the degree hemostatic function. The graph shows the rate of increase of platelet aggregation in response to increasing concentrations of ristocetin. The post-dialysis curve (orange) is consistently higher than the pre-dialysis curve (blue).

GP IIb activity following hemodialysis was consistently decreased, as shown by diminished aggregation in response to incremental concentrations of ristocetin (Figure 2). The EC50 for ristocetin following hemodialysis was 0.80 mg/ml, a statistically significant increase of 0.07 mg/ml over the pre-dialysis value ($p < 0.01$) (Figure 4).

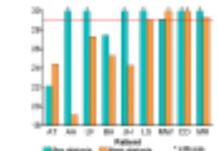


Fig 4
 The EC50 for ristocetin to determine the degree hemostatic function. The graph shows the rate of increase of platelet aggregation in response to increasing concentrations of ristocetin. The post-dialysis curve (orange) is consistently higher than the pre-dialysis curve (blue).

Baseline CSA platelet plug formation was abnormally prolonged in 6 patients and platelet-dependent fibrin clot formation was abnormally prolonged in 7 patients. In 6 patients, a clot had still not formed after the 30 minute observation period. Following dialysis, the time to platelet-dependent clot formation was shortened for 6 of the 6 patients for whom data could be analyzed (Figure 5).

Platelet microparticle formation was evaluated using flow cytometry in two patients. In response to 4 μ M calcium ionophore A23187, there was a dramatic increase in platelet microparticles following hemodialysis (Figure 5).

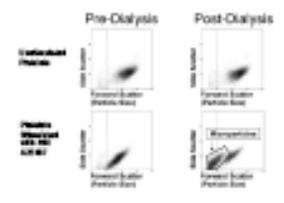


Fig 5
 Platelet microparticle formation was evaluated using flow cytometry in two patients. In response to 4 μ M calcium ionophore A23187, there was a dramatic increase in platelet microparticles following hemodialysis (Figure 5).

Discussion

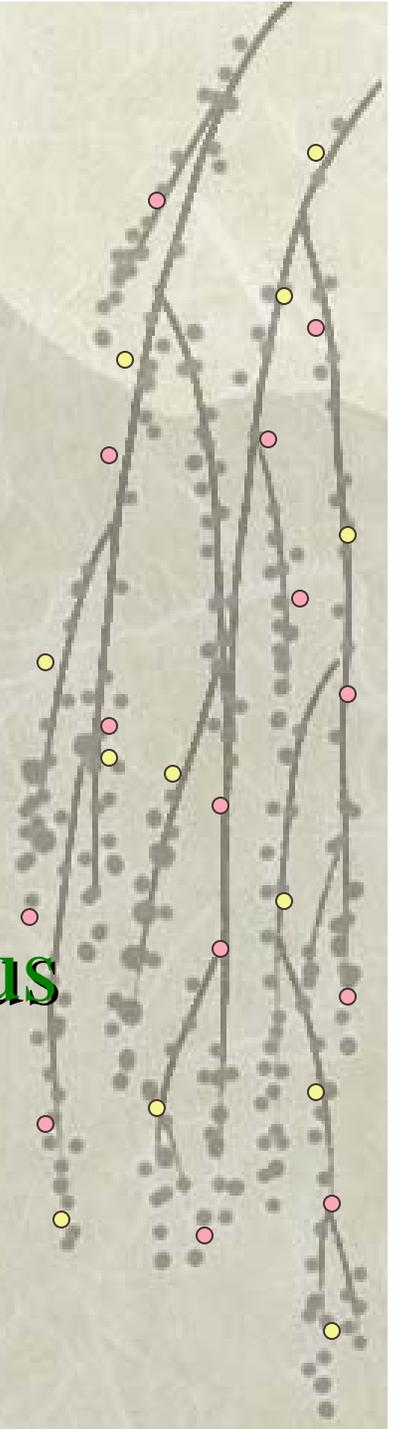
The bleeding diathesis of ESRD and the effect of hemodialysis on it are incompletely understood. Traditional measures of platelet function show a decrease in platelet GP IIb function following hemodialysis. Current laboratory tests are limited by the fact that they separate primary hemostasis from secondary hemostasis and therefore do not evaluate the role played by platelets in the coagulation cascade through their procoagulant activity and microparticle formation. The CSA instrument shows a strong trend toward shortening of the time to platelet-dependent fibrin clot formation for whole blood. This assay is sensitive to defects in platelet procoagulant function and platelet microparticle formation. Improvement in these parameters is, therefore, a possible mechanism by which hemodialysis produces an improvement in the bleeding diathesis of ESRD. Preliminary data on platelet microparticle formation from two patients supports this hypothesis. Studies are ongoing to assess platelet procoagulant function following hemodialysis.

Conclusions

- Shear-dependent platelet plug formation is defective in ESRD patients.
- Hemodialysis results in decreased GP IIb function manifested by decreased GP IIb mediated platelet aggregation in response to ristocetin even in the presence of increased von Willebrand factor levels.
- Platelet-dependent fibrin clot formation is defective in ESRD patients despite normal screening studies of secondary hemostasis (prothrombin time, partial thromboplastin time)
- Platelet-dependent fibrin clot formation is improved by hemodialysis, which may be related to improvement in platelet procoagulant activity or platelet microparticle formation.

Before starting

- **Know the intended audience**
- **Decide what the main message is**
- **List text, diagrams, tables, photos, etc. to be included**
- **Budget the space needs for various elements**
- **Sketch a layout**

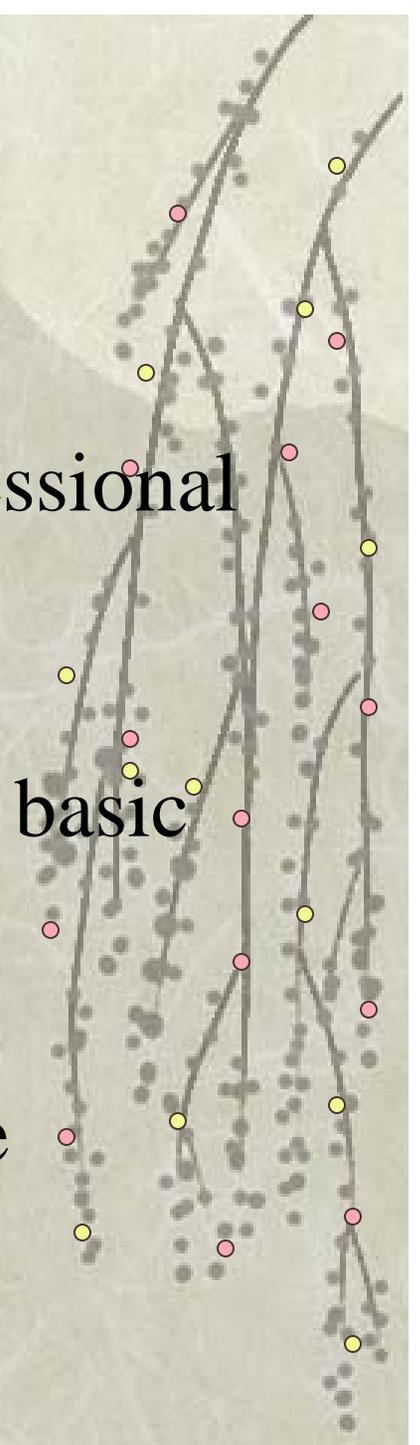


Who is the audience?

- **People in your specialty**
(may use jargon and other shortcuts)
- **People in related fields**
(minimize jargon but may assume knowledge)
- **People in unrelated fields**
(assume no prior knowledge; use the most basic terms)

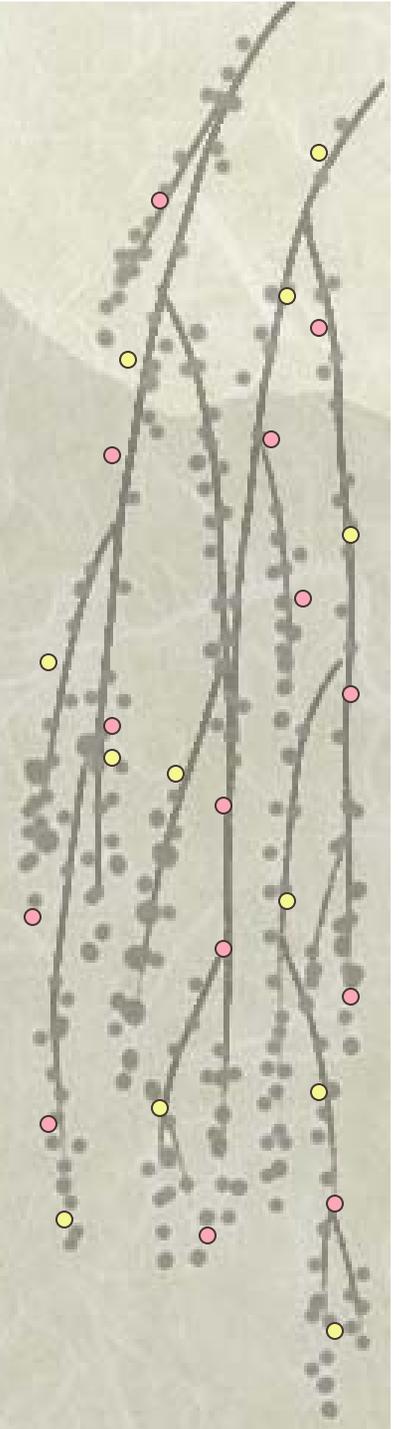
professional

basic



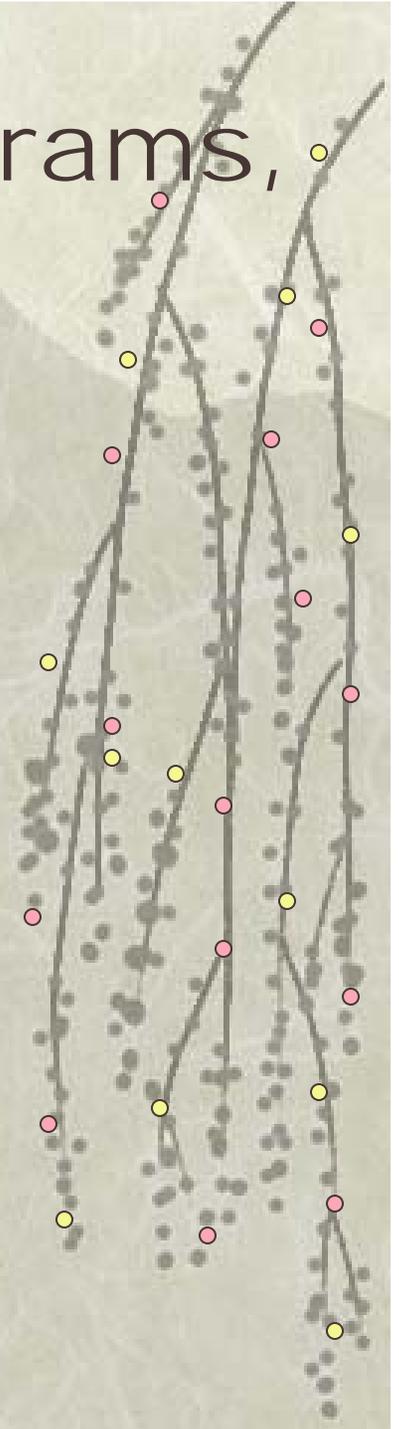
What is the message?

- **State the main point(s) and conclusion(s) succinctly**
(a catchy but descriptive title, an effective abstract or introduction)
- **Focus everything else on those points and conclusions**
(do not try to include everything in a poster)

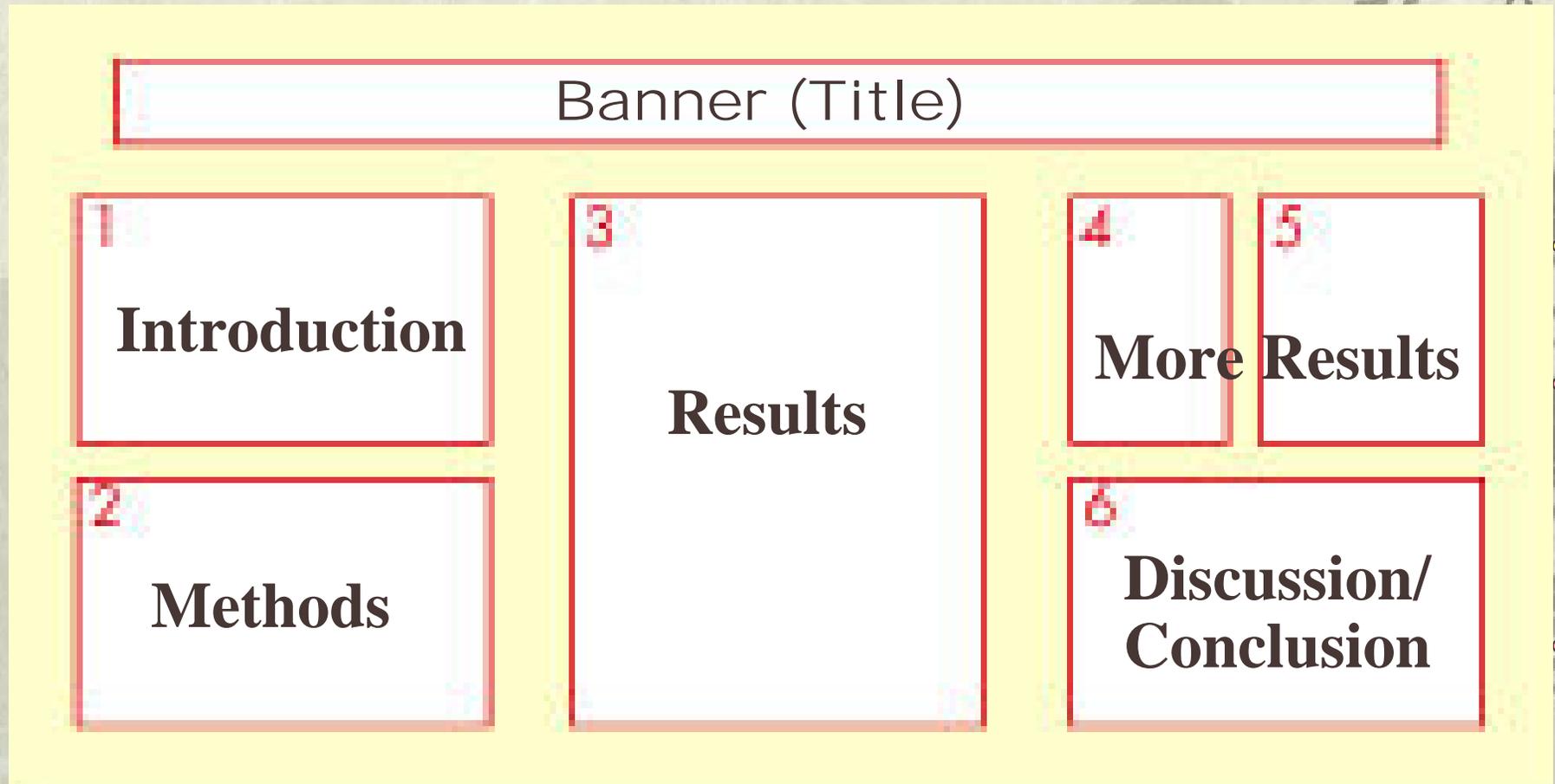


Should you use text, diagrams, tables or photos?

- Utilize all but be strategic and space-conscious.
- Follow: “A picture is worth ten thousand words”
- Tables are more effective than text, figures are better than tables.
- Use short sentences
- Check spelling and grammar
- Do not forget titles and legends

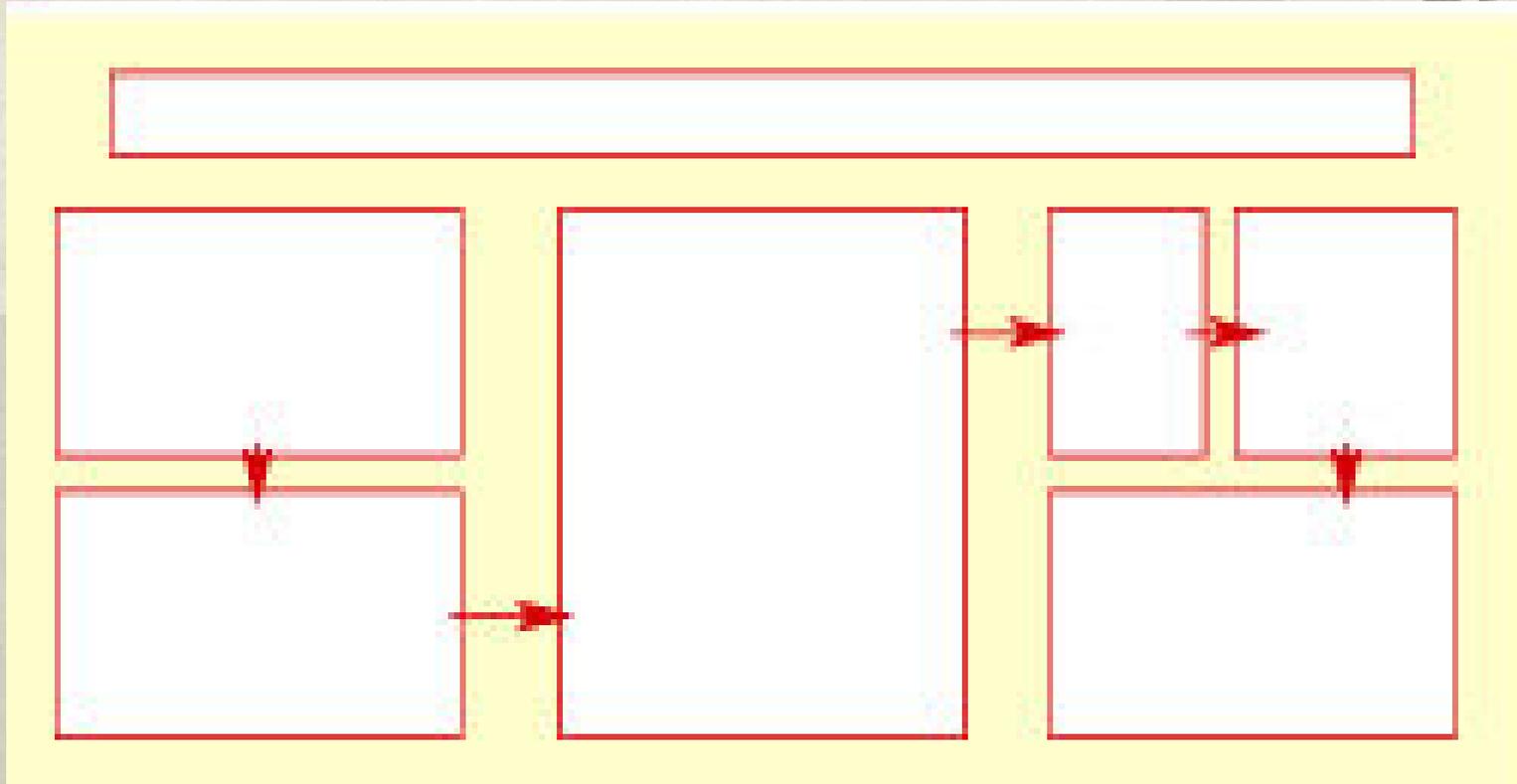


Three Panel Poster Layout



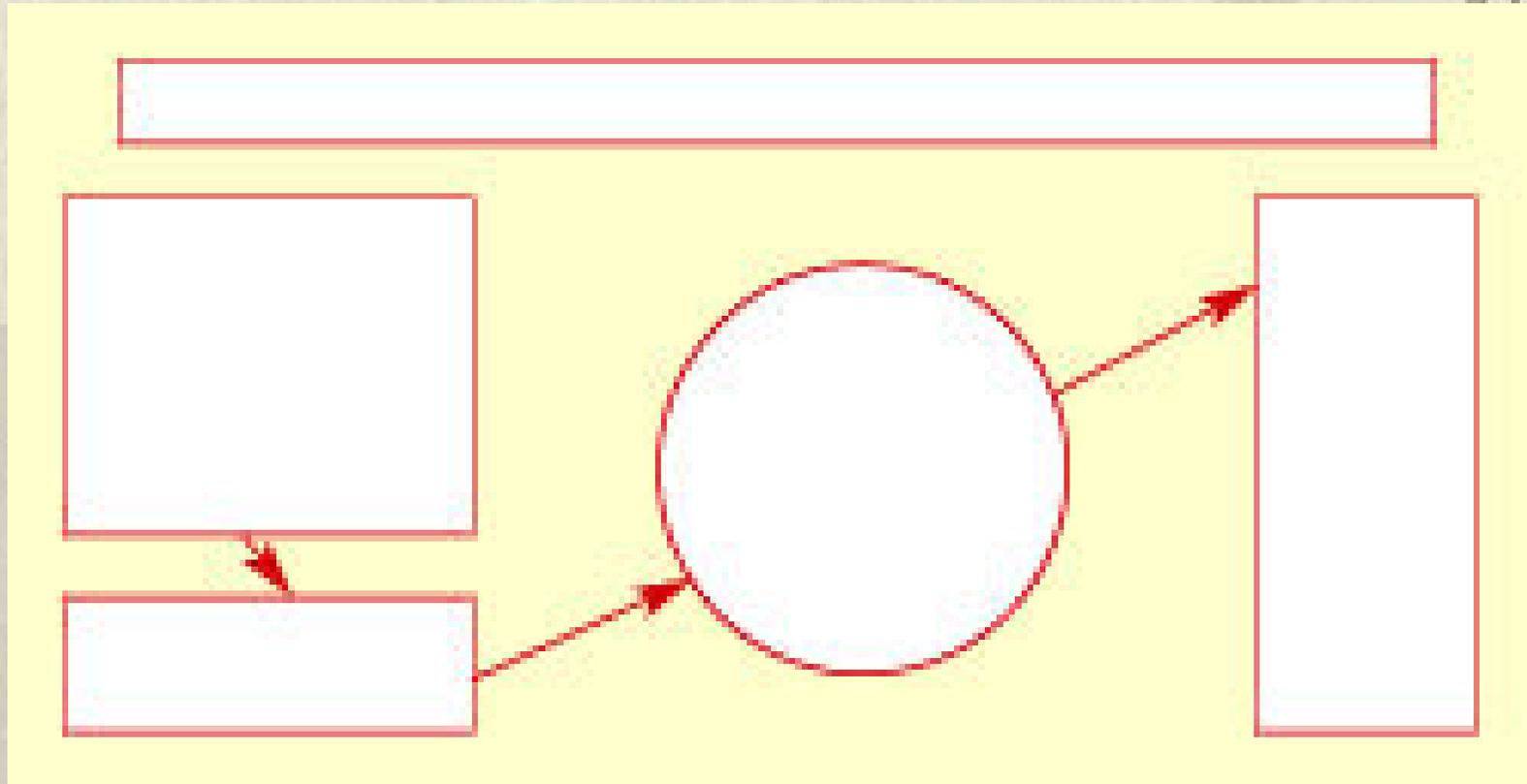
Numbering the panels to guide readers with the flow

Three Panel Poster Layout



Use of arrows instead of numbers

Three Panel Poster Layout

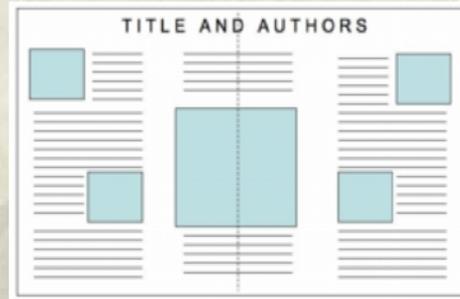


Use of elements of different sizes,
shapes, and proportions.

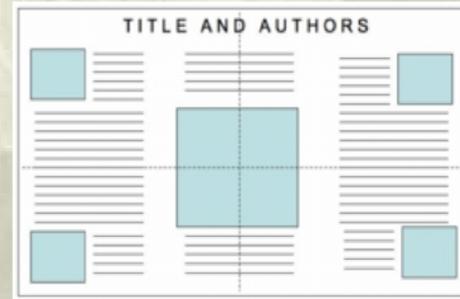
Poster Templates, Pictures and Graphics

Balance and White Space

Your poster should have a good visual balance of figures and text, separated by white space. Balance occurs when images and text are reflected (at least approximately) across a central horizontal, vertical, or diagonal axis of symmetry.



Horizontal Symmetry



Horizontal & Vertical Symmetry



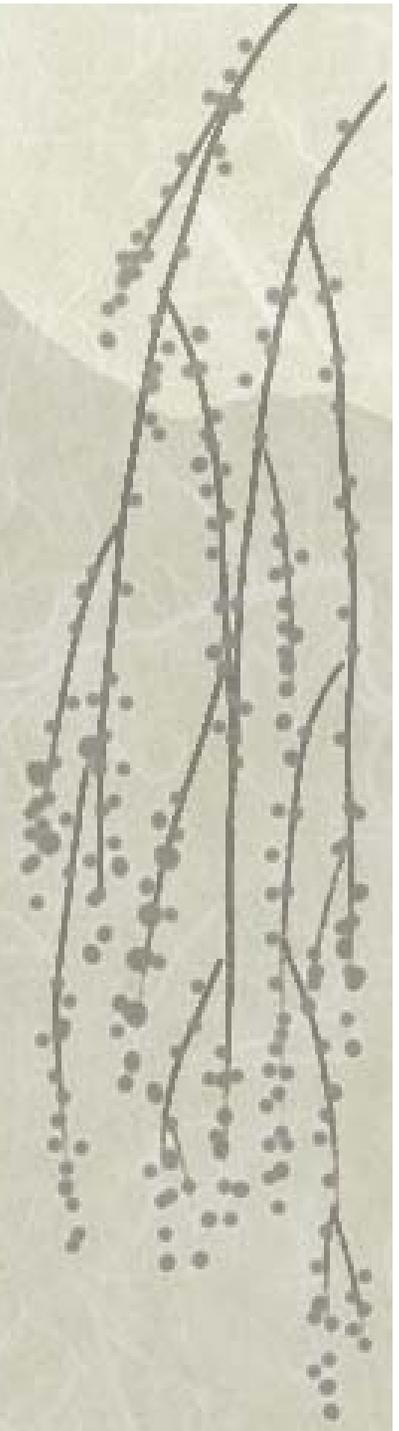
Diagonal Symmetry



Asymmetry
(text-heavy on left, image-heavy on right)

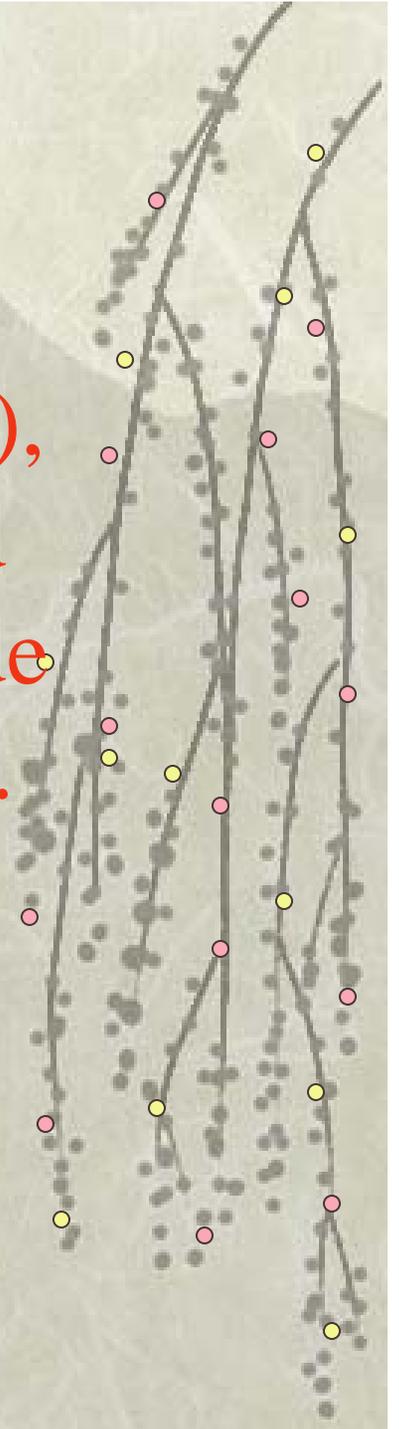
Text Blocks

Keep text blocks to below 50 words.



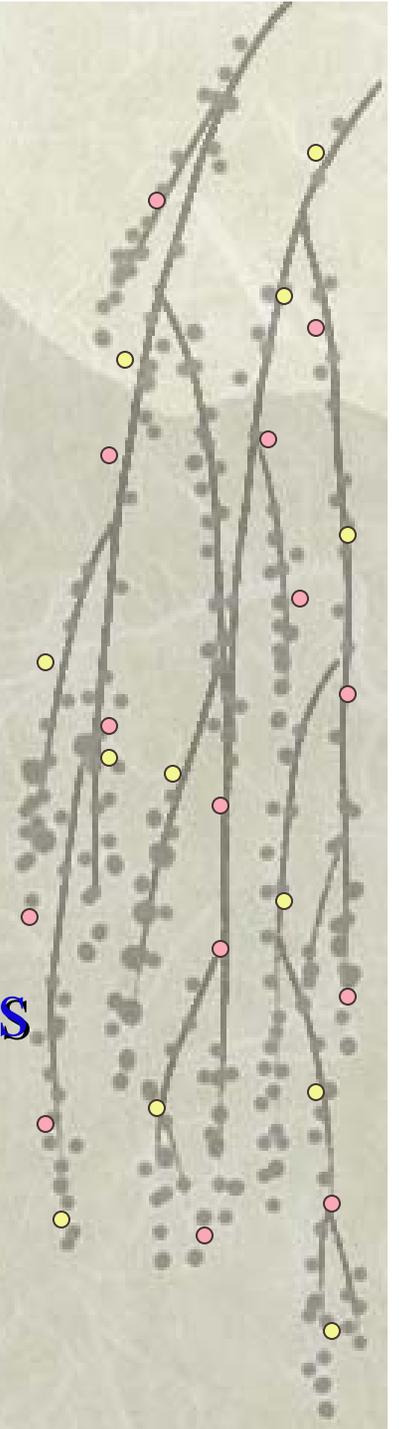
Banner (Title box)

- A banner shows the title, author (s), and affiliation. The banners should be 10–12 inches tall and 4 feet wide with 1-inch margins on all sides.
- The title should be concise and depict the project. It should be legible at 20 feet.



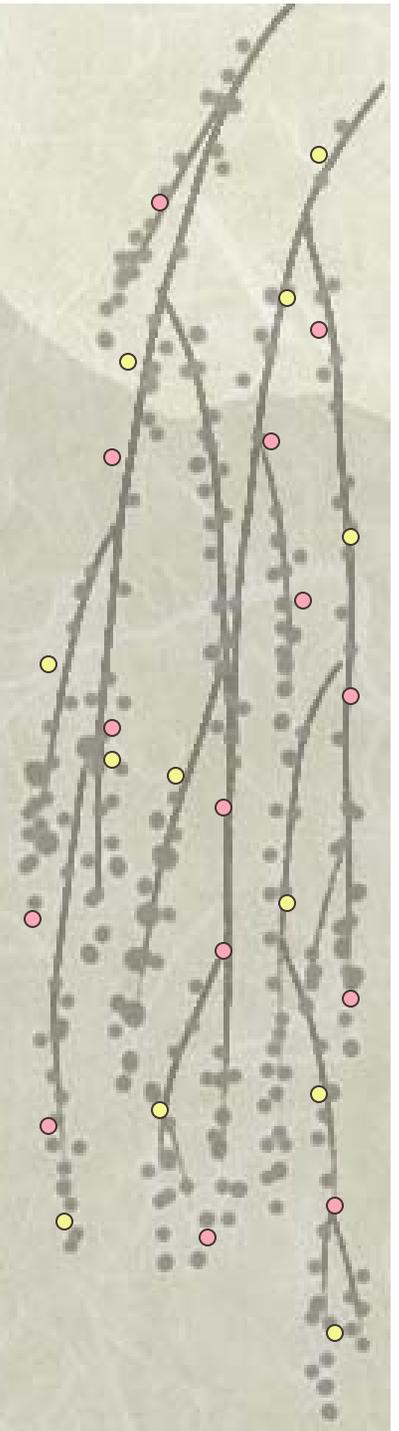
Abstract

- **Optional on a poster depending on the desire of the author or the requirements of the organization.**
- **It must accurately summarize the hypothesis or research question, the methods, the data, and the conclusions described in the other sections of the poster.**



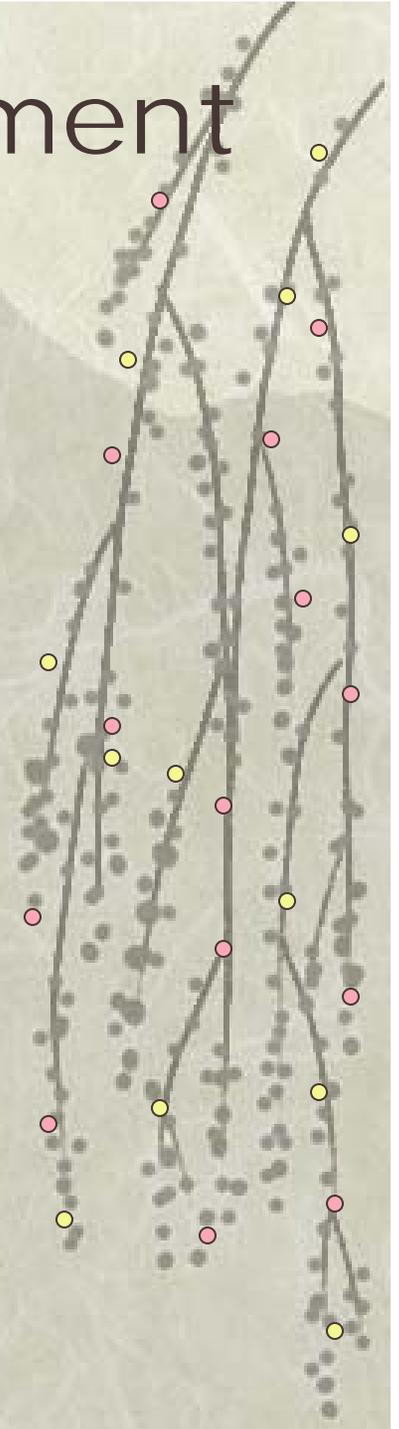
Introduction

- The introduction should address the question, “Why did you start this project?” It defines the topic and explains what was studied and why—the rationale and importance of your study.
- It includes your research question(s) and/or the hypotheses you tested.
- Make sure that the significance and originality of the work are very clear.



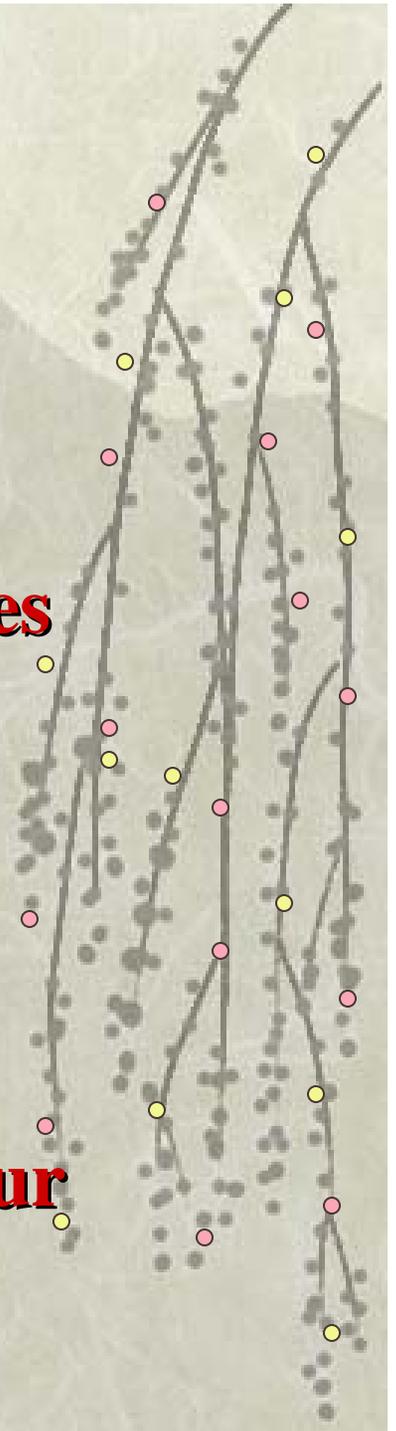
Methods, materials, equipment

- This section should explain what you did. Ideally, this section gives enough information to allow another researcher to replicate the study.
- It should have enough detail to allow another researcher to judge if the study design was adequate and thus to judge the validity of your study.
- Flow diagrams work well instead of written text. List major materials and equipment used.



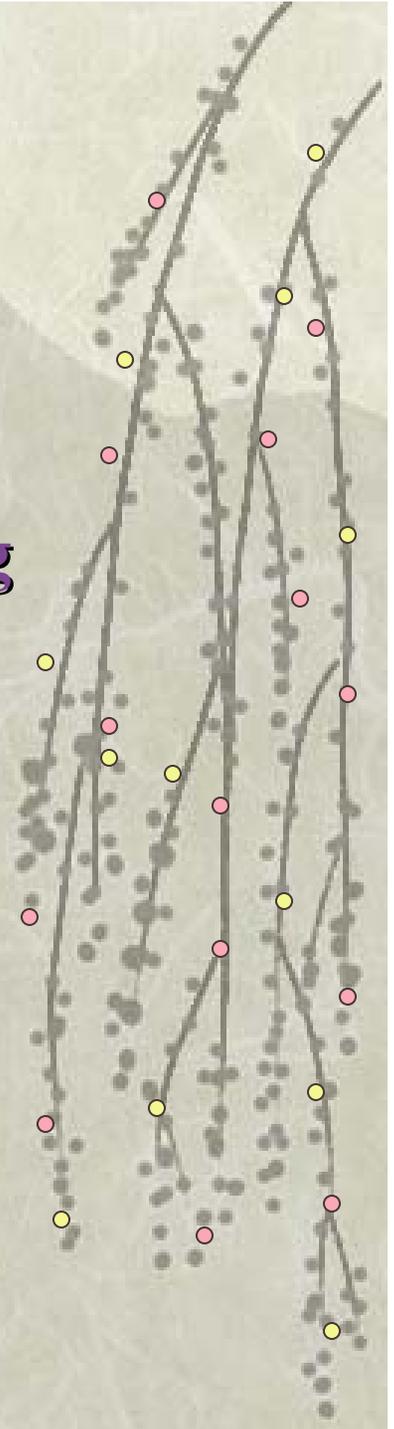
Results

- **This section presents what you have found in your research or the outcome of your project.**
- **It may include statistical analyses, tables and/or figures showing your data.**
- **Arrange your results in a logical order according to the point(s) you want to get across.**
- **Present only enough data to support your conclusions.**



Discussion/Conclusion

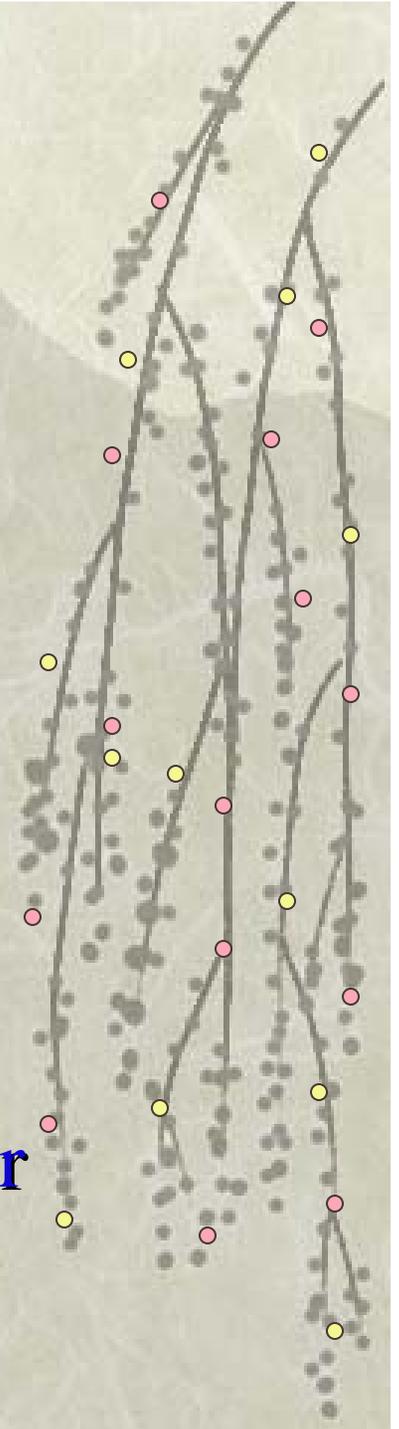
- **The discussion section, if included, tells what you think your results mean.**
- **This section may also present supporting evidence from published reports. Any contradictory findings should be addressed, and the limitations of your study should be described.**
- **The conclusion section should directly relate to the research question and hypotheses and supported by the results.**



General suggestions

Layout

- Use headings to help readers find key sections.
- Balance the placement of text and graphics.
- Use white space creatively to grab viewers' attention.
- Follow the normal flow of reading: top to bottom and left to right.
- Use column format to make poster easier to read in a crowd.



General suggestions

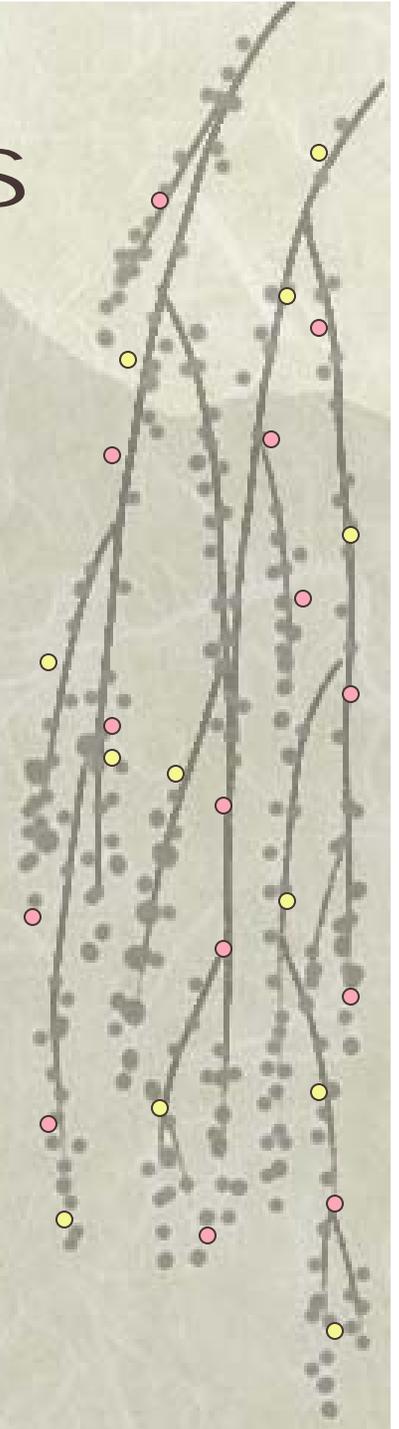
Text and Font

- Write simple, easily readable texts.
- Omit extraneous text by using key words and phrases.
- Highlight important words or phrases by switching styles: bold, underline, italic, shadow, etc.
- Do not use all capitals except in headings.
- Do not use too many different font types.
- Use large fonts: 18-point for the smallest text, 24-point for normal text, 28-point for heading, 48-point for title.

General suggestions

Photos, figures and tables

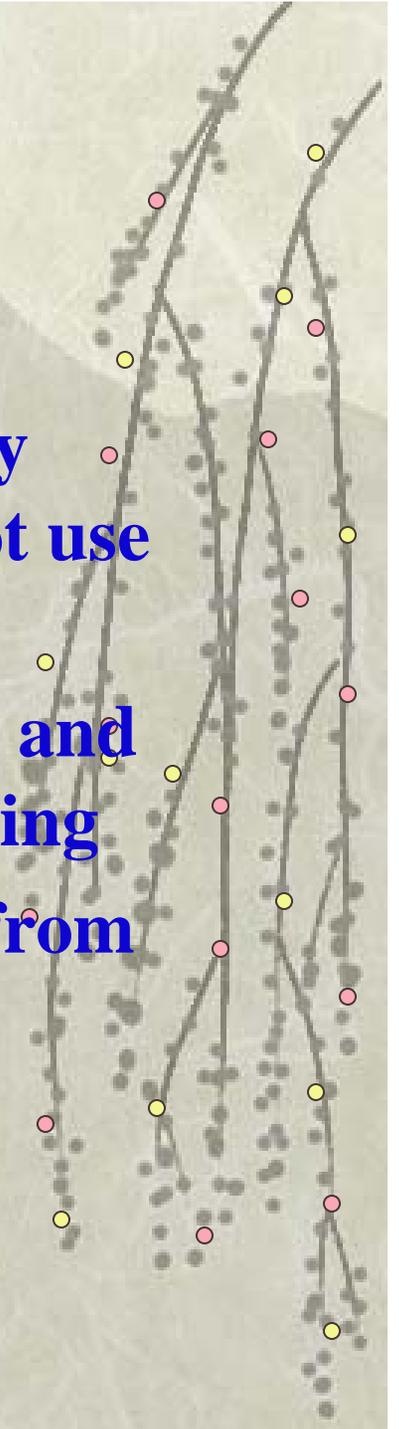
- Should be clear, self explanatory, uncomplicated, and of sufficient size.
- Tables and figures must have titles.
- Figures must include legends.
- Use good color contrast in figures.
- Borders on photos and figures can enhance presentation



General suggestions

Color and contrast

- Use color to draw attention to particularly important parts of your poster (but do not use everywhere)
- Use pleasing contrast to reduce eye strain and make the poster more legible and interesting
- Note that printed color may be different from what appear on the computer monitor



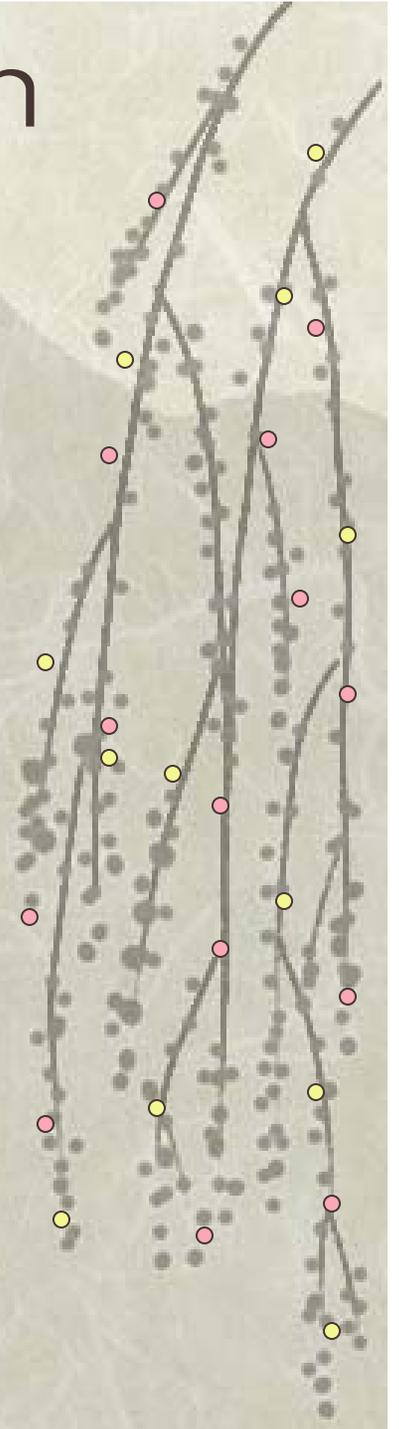
Additional information

Useful Website

<http://www.aspb.org/education/poster.cfm>

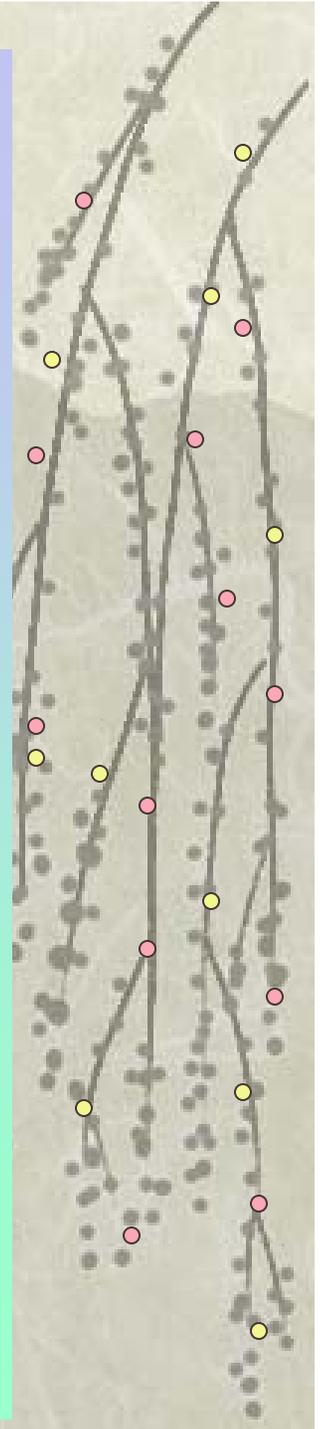
Software

MS Word, MS PowerPoint, Adobe Illustrator, LaTeX
InDesign



On Showcase Day

- **Be prepared to give a 2-minute presentation to judges**
- **Focus on the big picture, explain why the problem is important, and use the graphics to illustrate and support your key points.**
- **Limit jargon, judges may be from a mix of specialties in the discipline.**
- **Arrive early at the display site. Set up display before 1 pm.**
- **Bring the poster and all accessories.**
- **Bring copies of a handout (optional)**
- **Be there between 3 and 6:30 pm.**





Thank You

**Have fun
making
posters
and
enjoy the
Project
Showcase**

