

Effective Communication: Posters and Newsletters

IAN Science Communication Course
NOAA Coastal Science Center

April 8, 2008



University of Maryland
CENTER FOR ENVIRONMENTAL SCIENCE

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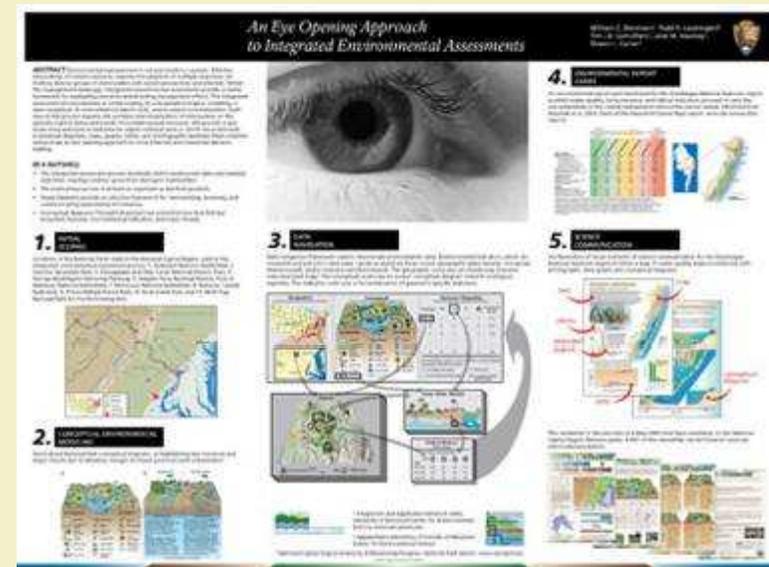
integration

application

network

Outline

- General design principles
- Use of maps and aerial photos for context
- Use of color
- Tips for posters
- Tips of newsletters



integration

application

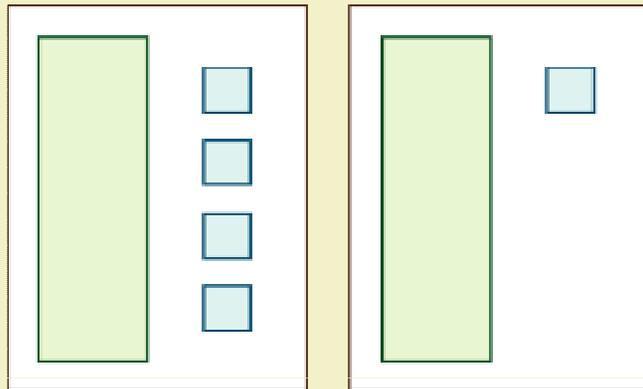
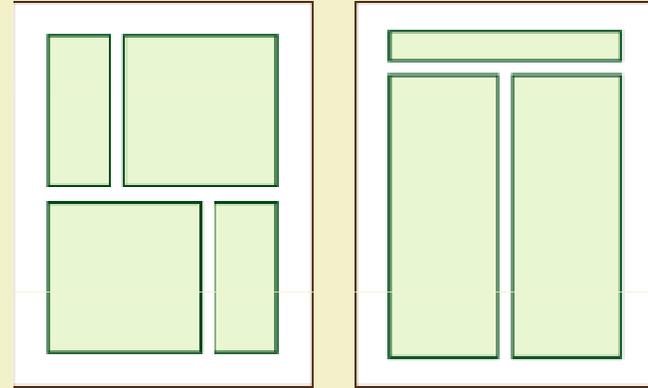
network

Design principles for effective print documents

- Balance
- Proximity
- Alignment
- Contrast and emphasis
- Blank space

Balance

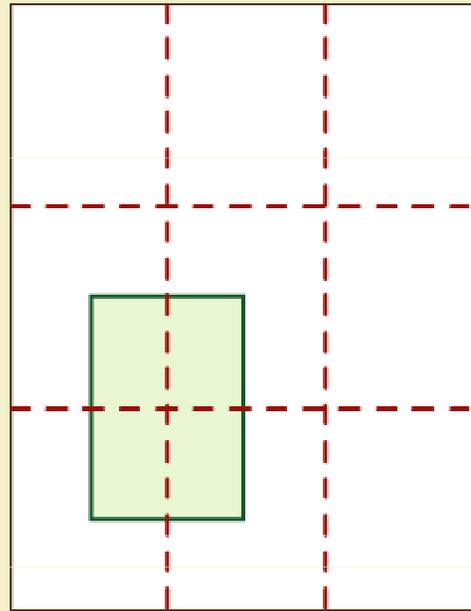
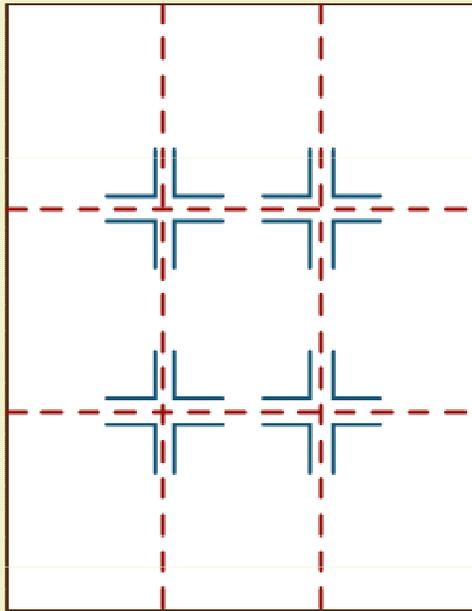
These designs are symmetrical



The left design is balanced, the right creates tension

Balance

Dividing in thirds is often more subtle than dividing in halves

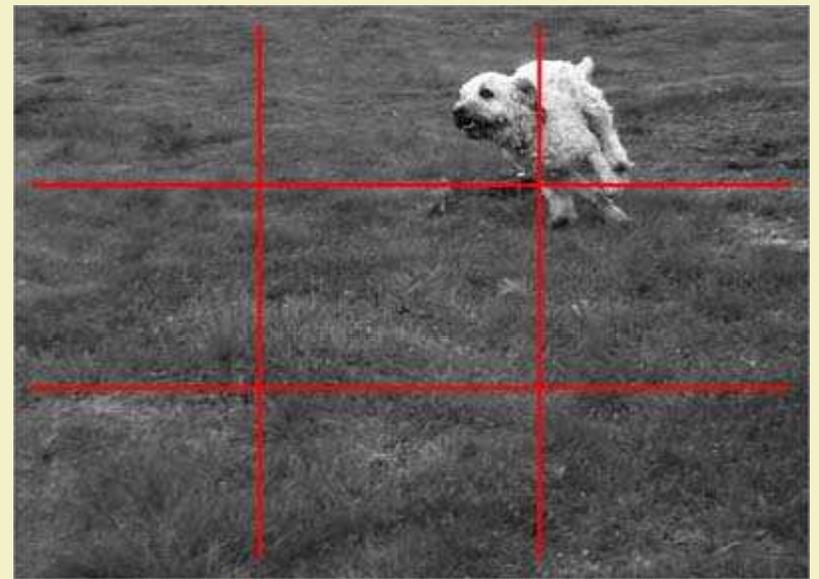
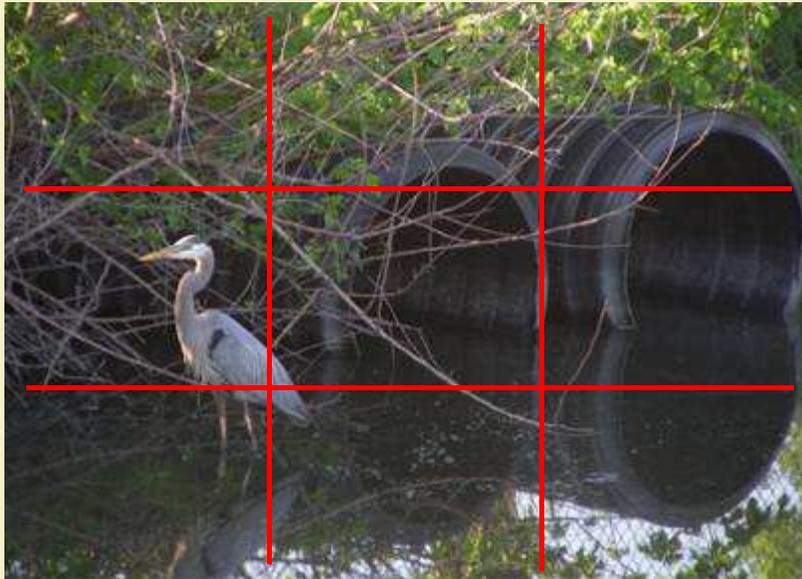


integration

application

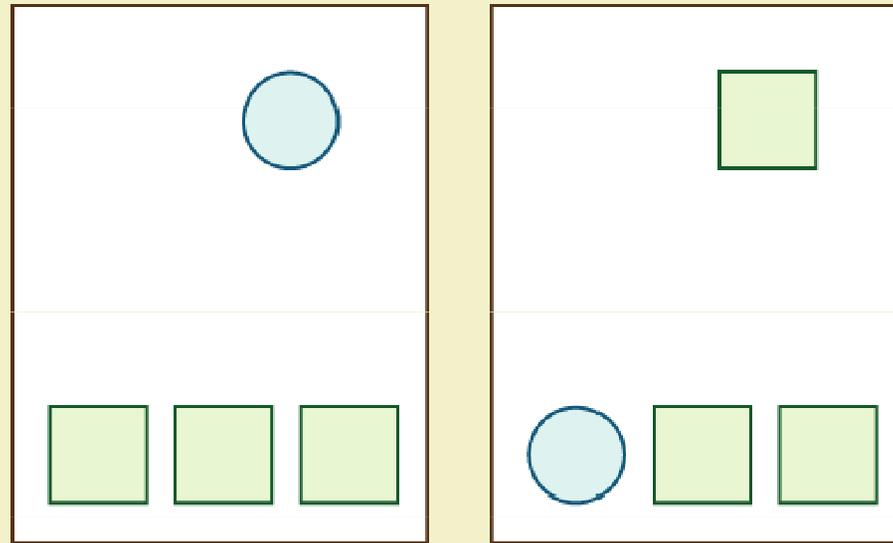
network

Balance



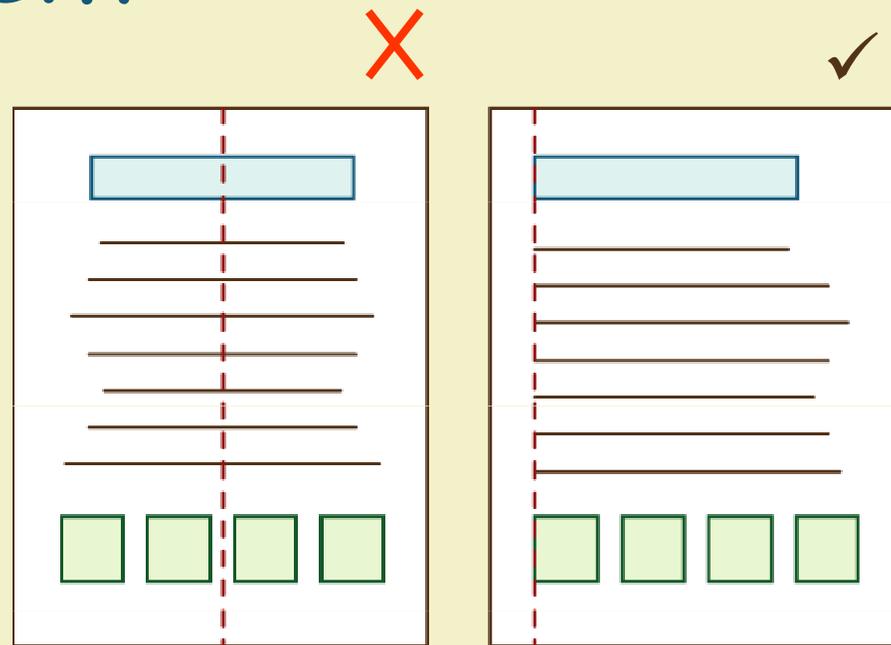
Place the focus of the image along the column line or intersection

Proximity



Proximity of objects can be used to imply association – whether objects are similar or different

Alignment



- Alignment can be used to help draw a reader through a document
- Center alignment of text can be difficult to read

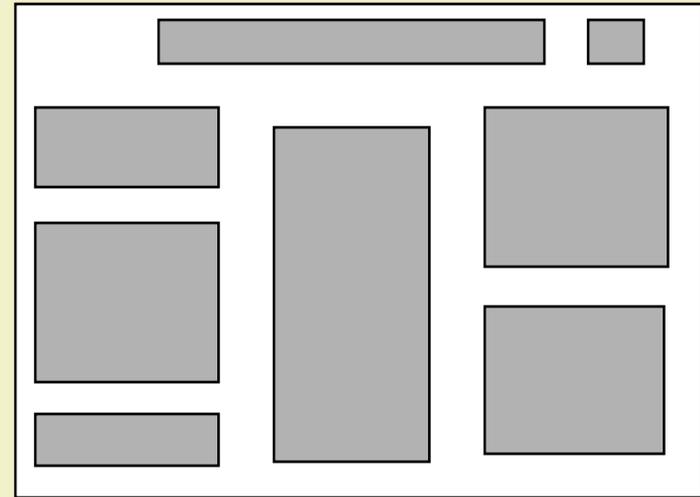
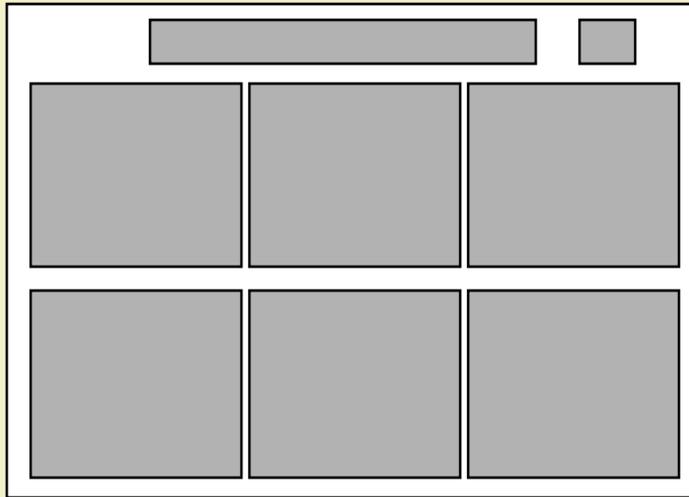
Contrast and emphasis

Contrast
with color

Contrast
with **TYPE**

Contrast with
SIZE

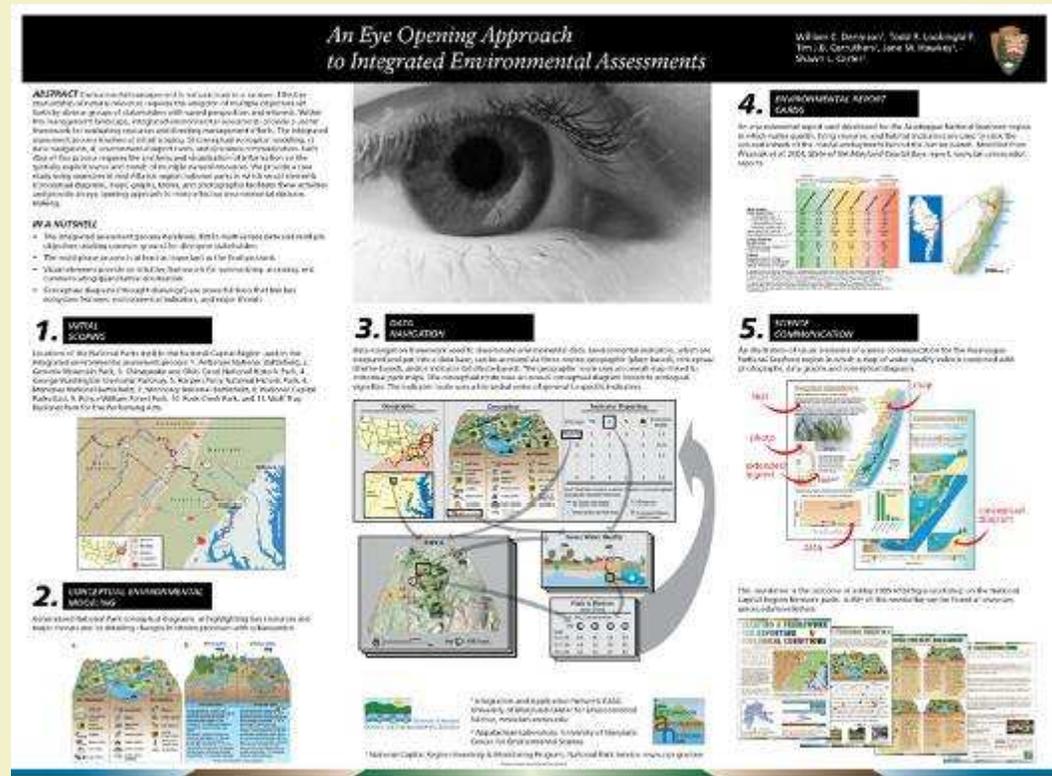
Blank space helps readability



- No blank space creates a 'crowded' feel
- Blank space is easier to read, and allows for flow between sections

Tips for posters

- Types of posters
- Software
- Titles and text
- Color
- Mock-ups
- Time allocation
- Handouts



integration

application

network

Types: Technical/methods

- Audience – specialist scientists
- Includes – detailed methods
- Capturing attention less important
- Need to justify key elements of techniques
- But... still includes photos/maps/conceptual diagrams

Remote Sensing of Toxic Cyanobacterial Bloom: *Lyngbya majuscula*

Lyngbya majuscula
 Lyngbya is a cyanobacterial genus, which is capable of forming blooms.

- It is a major freshwater cyanobacterial toxin producer.
- It is a major freshwater cyanobacterial toxin producer.
- It is a major freshwater cyanobacterial toxin producer.

Project Outline

Algal blooms have been mapped successfully from satellite data in a number of different marine, estuarine and coastal environments worldwide. A large-scale bloom of *Lyngbya majuscula* (a toxic cyanobacterium) occurred throughout Moreton Bay (southeast Queensland) during January - May 2000. This bloom was significantly different from past blooms in that it formed from an isolated sector of the Bay (Deception Bay) to cover a significant extent of the bay and nearby precincts (Golden Beach).

An essential component of studying the origins and development of the bloom is an accurate and cost-effective means to map the extent of the bloom and its biophysical properties.

An operational approach is being designed for monitoring the extent and dynamics of *Lyngbya* blooms in Moreton Bay from a combination of satellite and ground-based data. This approach focuses on making field data to enhance and validate imaging data. Techniques needed in the field include water sampling, spectrophotometry, biomass and cover measurements.

Collection and processing of field biophysical and spectrophotometric data have established the capabilities for airborne and satellite imaging systems to map the extent and dynamics of *Lyngbya*, by relating to the background of water turbidity and sea grasses. The main photosynthetic pigments in cyanobacteria differ from those of algae and other organisms that may show high resolution characteristics from other photosynthetic organisms such as sea grasses, diatoms and macroalgae.

The next step in the process is to develop image processing algorithms for mapping the extent of the bloom and to develop a robust approach for data acquisition and processing for the next *Lyngbya* bloom.

Remote Sensing of Marine Environments

Remote sensing of the environment is a critical role of the remote sensing community. Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and is based on the interaction of electromagnetic radiation with the object and the sensor. Remote sensing is used in many fields, including agriculture, forestry, geology, and environmental science. Measurements of water temperature, salinity, and chlorophyll *a* are common. Remote sensing is also used in many other fields, including agriculture, forestry, geology, and environmental science.

Mapping Lyngbya

Remote sensing of *Lyngbya* blooms is a critical role of the remote sensing community. Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and is based on the interaction of electromagnetic radiation with the object and the sensor. Remote sensing is used in many fields, including agriculture, forestry, geology, and environmental science. Measurements of water temperature, salinity, and chlorophyll *a* are common. Remote sensing is also used in many other fields, including agriculture, forestry, geology, and environmental science.

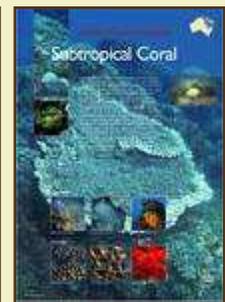
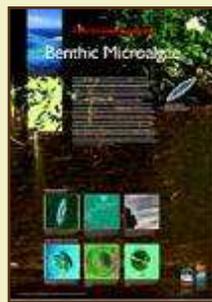
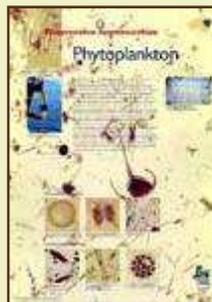
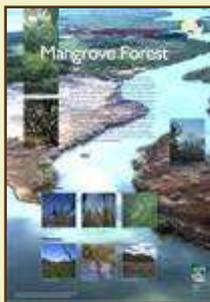
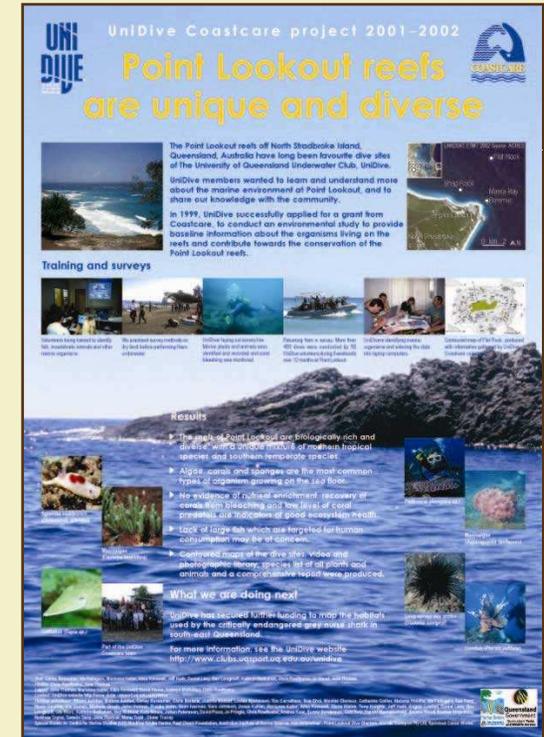
Where to next

Field and image processing studies will be used to provide information to identify time cause of bloom and monitoring growth:

- Select most accurate and cost-effective mapping approach for airborne and satellite imaging systems
- Map the development of the 2000 Moreton Bay bloom and produce bloom dynamics maps
- Assist designing a field sampling program to map biophysical properties of the bloom
- Identify potential causes of the bloom

Types: General public

- Audience – general public
- Includes – message, no justification
- Capturing vital attention
- Need to be visually attractive
- So... good photos are key



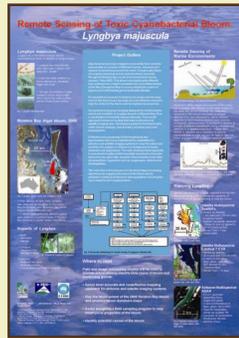
integration

application

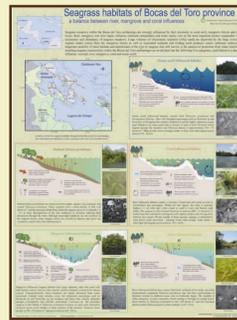
network

Types of science posters

Your target audience determines the mix of poster elements



Specialist
scientists



Informed
public



General
public

Formatting tip:
If in doubt, use a plain background.

Use a short, active, large title

Effects of photosystem II inhibiting herbicides on salt excreting and non salt excreting mangroves with differing root morphologies, in Mackay, Australia

Author M. One and Author C. Two
Marine Botany Group, Centre for Marine Studies, The University of Queensland, St. Lucia 4072, Australia

Abstract

An initial investigation of species-specific dieback of the mangrove *Avicennia marina* in the Mackay region, Queensland, identified two photosystem II-inhibiting (PSII) herbicides, diuron (DCMU) and ametryn as the most likely causes of dieback. In this study, four mangrove species, *Avicennia marina* and *Aegiceras concinatum* (salt excreters), and *Rhizophora stylosa* and *Ceriops australis* (salt excluders) were treated with a range of concentrations of diuron, ametryn and atrazine, in a controlled tidal tank system. Herbicide treatments demonstrated a more pronounced effect in the salt excreting species than the salt-excluding species. The highest herbicide concentration dosages (4000 µg kg⁻¹) caused a rapid decline in photosynthetic efficiency (F_v/F_m) in both *Avicennia marina* and *Aegiceras concinatum*, with *Avicennia marina* appearing to be highly susceptible to these herbicides. Differing root morphologies, rates of transpiration and metabolism of specific herbicides may play an important role in rate and amount of herbicides translocated in the plant. These results support field observations from the Mackay dieback incident where *Avicennia marina* was shown to be significantly more susceptible than other mangrove species to the agent causing



Introduction

In 2000, widespread dieback of the mangrove *Avicennia marina* was observed in the Mackay region, Queensland (Figure 1). Two Photosystem II (PSII) herbicides, diuron and ametryn, were detected in the



Results and Discussion

The salt-excreting species were more susceptible to the PSII herbicides than the salt excluding species. At a dosage concentration of 4000µg kg⁻¹

Ineffective



Effective

Stream herbicide concentrations reduce mangrove photosynthesis

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- The one main message of the document should be summarized in the title
- Title can be a statement or a question
- If you can't read it from ~30 feet/~10 meters, it is too small
- Use sans serif font at 96 pt (2 inch/5 cm high letters)

integration

application

network

Authors and affiliations second only to title

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Effective

- Authors' names should be easily legible
- Put authors' names at top
- Include relevant, high quality logos (not web grabs)
- Photo of principal author is useful

integration

application

network

Use active subtitles

Results

Assessment of nitrogen or phosphorus limitation can be important in assessing potential threats to an ecosystem as well as setting management priorities. An indirect way to assess limitation is to measure tissue nutrient content of a dominant macrophyte such as *Thalassia testudinum*. Limitation can be inferred if percentage of leaf biomass is below 1.8% N or 0.2% P (Daune, 1990). Overall, sites in Nichupte and Puerto Morelos Lagoons had abundant nitrogen (2.28%) but were phosphorus limited (0.15%). This agrees with previous studies in Caribbean carbonate sediments (Short, 1990).

Nichupte lagoon had higher total N loading than Puerto Morelos Lagoon, as C:N ratios in *Thalassia* leaf tissue had lower (ie more N) (13:1 and 16:1) in Nichupte than Puerto Morelos (20:1 and 23:1) Lagoon. The N entering Nichupte Lagoon is from sewage, evidenced in the high $\delta^{15}N$ values (9.06 and 5.49) relative to Puerto Morelos Lagoon (1.77 and 1.37). Studies of *Capricornia* in Australia show the same response to known sewage inputs (Udy and Dennison, 1997).

N loading in Nichupte Lagoon has increased since 1991, *Thalassia* leaf tissue sampled in 1991 had a mean of 2.07% N which has now increased to a 2002 mean of 2.71%.

Discussion

Total loading of N and P are higher adjacent to submarine springs than background levels in the Puerto Morelos Lagoon. %N and %P in *Thalassia* leaf were both higher near submarine springs (2.11%N and 0.18%P vs 1.80%N and 0.13%P) providing an integrated measure of nutrient inputs. Even in the dry season, some freshwater flow results in lower salinity adjacent to the submarine springs (33.29±0.29 ppt) than background values for the Puerto Morelos Lagoon (36.24±0.01 ppt).

References cited

Acknowledgements

Conceptual diagram of water flow and nutrient sources

Ineffective



Effective

Replace methods/results/discussion with synthetic active subtitles

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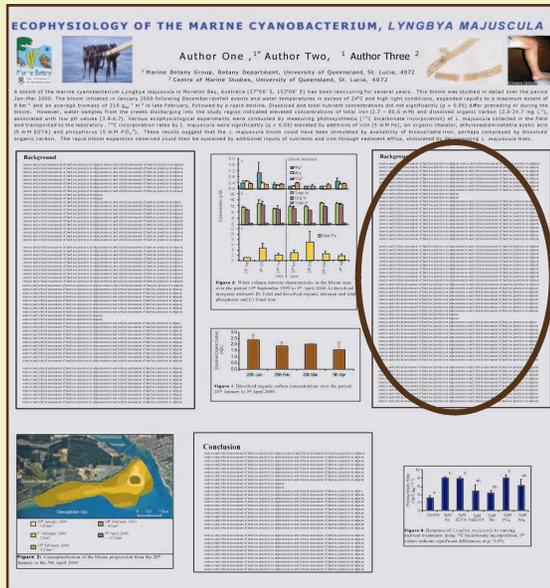
Conceptual diagram of water flow and nutrient sources

integration

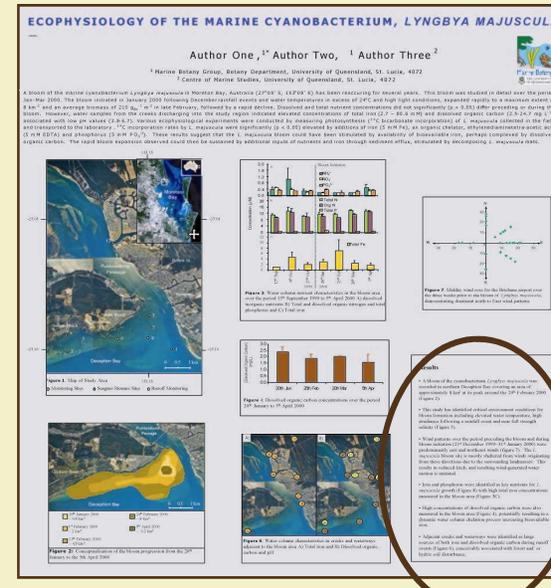
application

network

Clear, large text should be used to support graphics



Ineffective



Effective

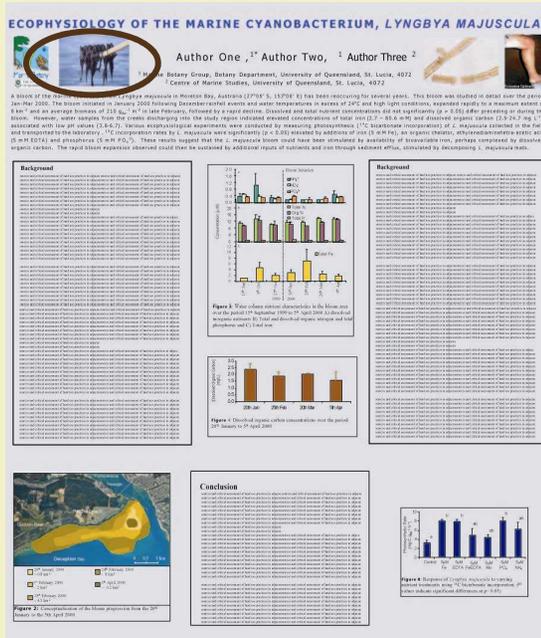
- Use a clear, system font (e.g. Arial)
- 0.5 inch/1 cm tall when printed, i.e. approx. 24 pt
- Use bullet points and extended legends (not an essay)

integration

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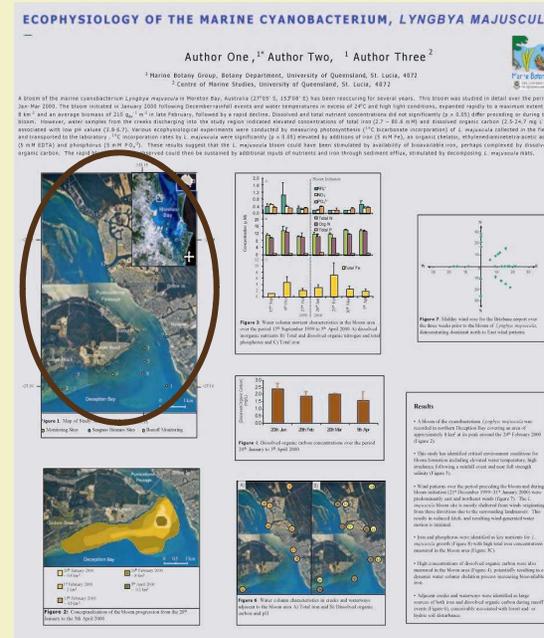
Use photos/maps for context - not decoration!



Ineffective



Effective



- Need to provide good context (maps/aerial photos)
- Photos should AT LEAST have a caption!
- Distinguish captions from the rest of the text

integration

application

network

Judicious use of color

Results

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Isla Cancun (Hotel Zone) has undergone 30 years of intense development and is a source of sewage nitrogen to Nichupte Lagoon.

Submarine spring (cayo de agua), source of fresh water and nutrients to the Puerto Morelos Lagoon.

Level loading of N and P are higher adjacent to submarine springs than background levels in the Puerto Morelos Lagoon. %N and %P in *Thalassia* leaf were both higher near submarine springs (2.11% vs 1.80% N and 0.18% vs 0.13% P) providing an integrated measure of nutrient inputs. Even in the dry season, some freshwater flow results in lower salinity adjacent to the submarine springs (33.29±0.29 ppt) than background values for the Puerto Morelos Lagoon (36.24±0.01 ppt).

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Conceptual diagram of water flow and nutrient sources into the Nichupte and Puerto Morelos lagoons

Ineffective



Effective

Nichupte and Puerto Morelos Lagoons P limited

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Sewage N evident in Nichupte Lagoon and N load increasing

Submarine springs a source of N and P to Puerto Morelos Lagoon

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- Subtle background and one or two high contrast text colors
- Colors and icons can be used to link photos/figures & text

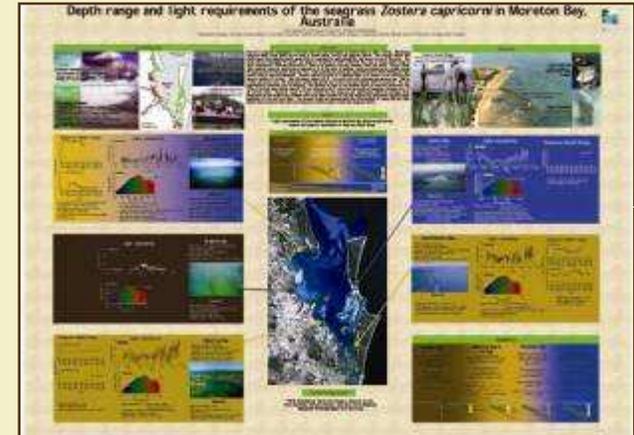
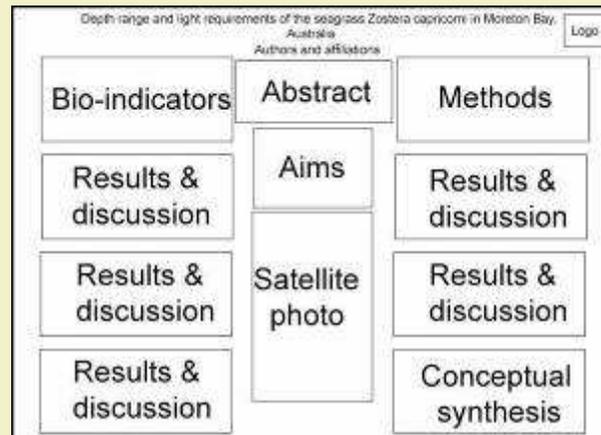
integration

application

network

Mock up and review, review, review

Depth range and light requirements of the seagrass *Zostera capricorni* in Moreton Bay, Australia



Title



Mock layout



Final poster

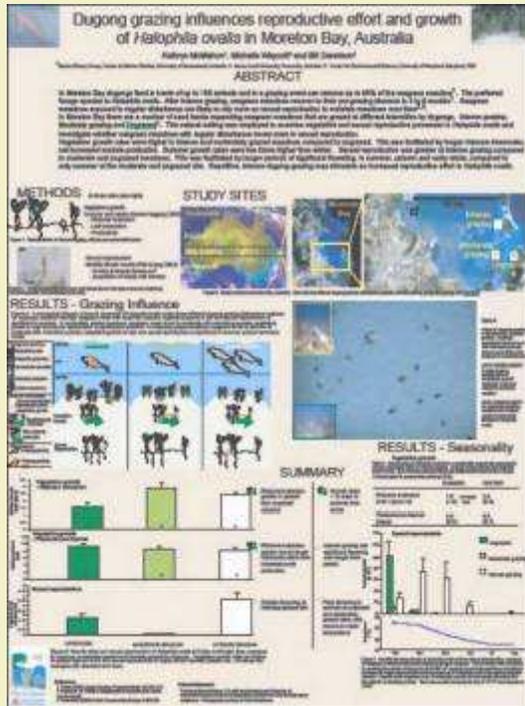
- Start with fundamental message – the title
- A mock layout helps plan balance and flow
- Does it work? Get input from others
- Run the 10 second test (the time available on average to get a reader's attention)
- Check the required size requirements/limitations

integration

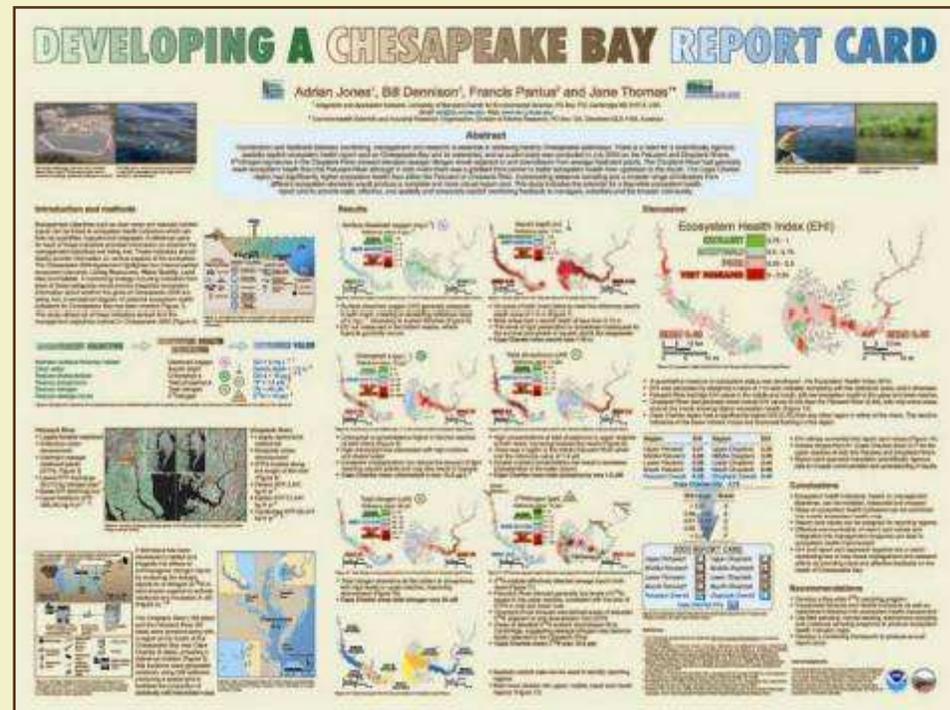
application

network

Do you have a week of your life to spare?



3 – 5 days

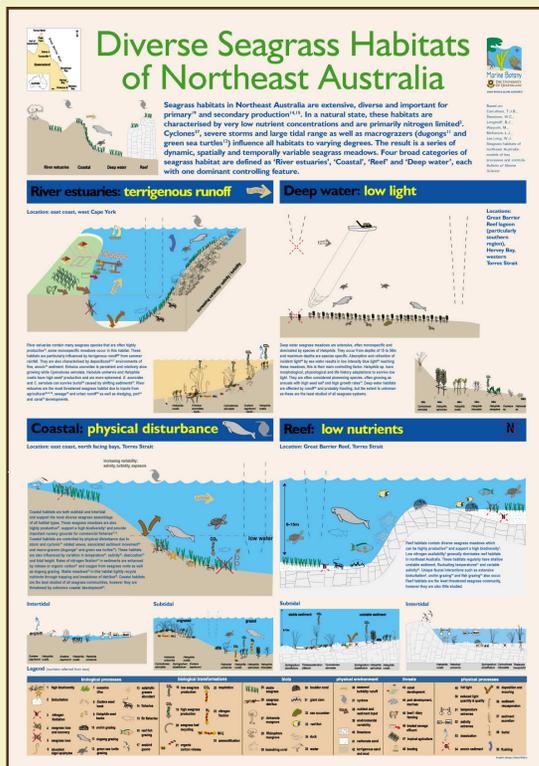


8 – 10 days

An effective poster takes time, even after all the data is analyzed

Make handouts

- Should be able to read text printed at A4
- Ensure your address is readable



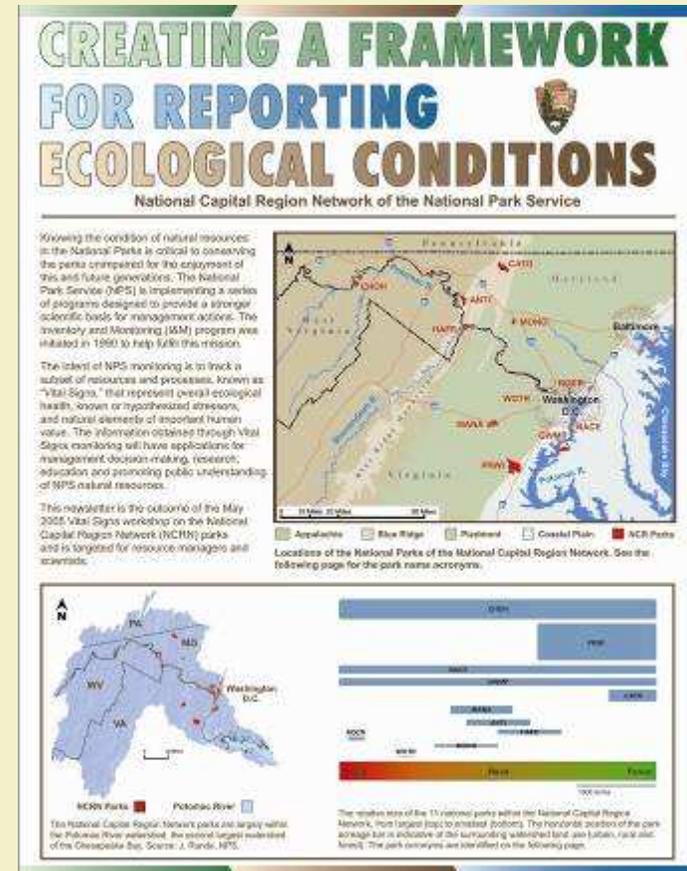
integration

application

network

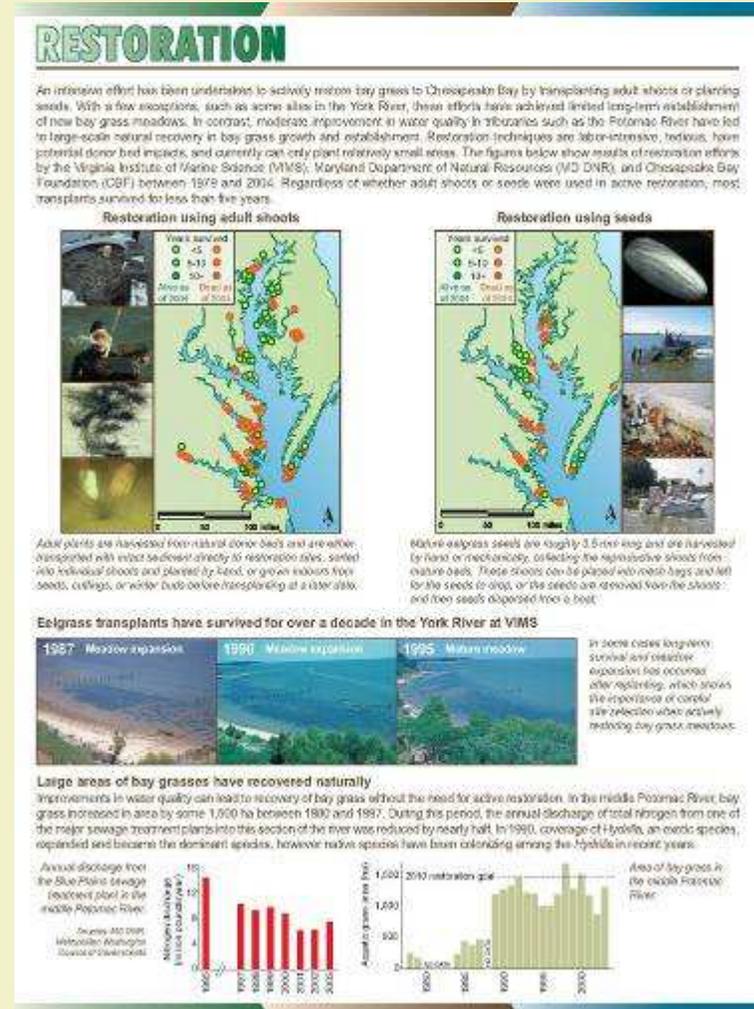
Tips for newsletters

- Many poster tips apply
- Broad audience consideration
- Effective 4-page spread
- Front page elements
- Back page elements

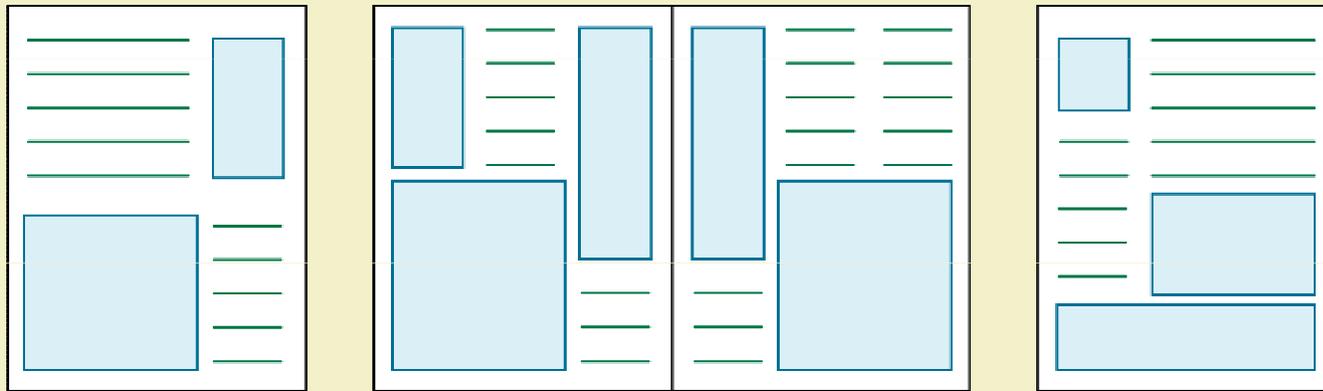


Poster tips that also apply to newsletters

- Active titles and subtitles
- Visuals that provide context
- Use the right software



4-page spread



- Depending on size, use 2 or 3 columns pages
- Text boxes and visuals can take up 1,2, or 3 columns

Front page elements

- Descriptive title
- Abstract or summary of message
- Interesting visuals

HURRICANE ISABEL AND SEA LEVEL RISE



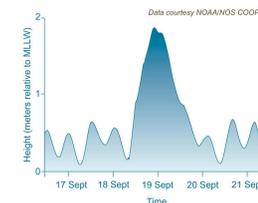
On Thursday September 18, 2003, Hurricane Isabel made landfall between Cape Lookout and Cape Hatteras on North Carolina's Outer Banks. A massive Category 2 hurricane, Isabel's strong winds and tidal surge resulted in widespread flooding, damage and power outages from North Carolina to New York.

Sea level in the Chesapeake Bay has risen by approximately 30 cm or 1 ft in the last 100 years. This is due to a combination of worldwide trends, such as global warming, and local factors like land subsidence and groundwater extraction.

Hurricane Isabel caused more flooding and damage than would normally be expected of a Category 2 hurricane and this may be partly attributable to local sea level rise. Chesapeake Bay sea level is continuing to rise at nearly double the global average which suggests that the effects of tropical storms and hurricanes like Isabel may increase in severity in the future.



Hurricane Isabel crossing the east coast of the USA on Thursday September 18, 2003.



Sea level height at Cambridge, Maryland, with the storm surge from Hurricane Isabel clearly visible.



Post-Isabel flooding in Cambridge.



Flooding in Annapolis.

Back page elements

- Reference list
- Contact information
- Acknowledgements

MORE FLOODING FROM ISABEL THAN 1933 STORM

On August 23, 1933 an unnamed hurricane crossed the coast at Nags Head, North Carolina. Like Isabel, it was a Category 2 hurricane at landfall and set the benchmark by which other Chesapeake storms are measured. Isabel and the 1933 hurricane were very similar in terms of minimum pressure, maximum sustained wind speed, tidal surge and storm track (see table, below and map, right).

	1933 hurricane	Hurricane Isabel 2003
Min. pressure (hPa)	29.20*	29.20*
Max. sustained wind	90 mph	90 mph
Tidal surge in Potomac River (feet above MLLW)	11.1'	11.3'

Comparison of statistics at landfall from the unnamed hurricane of 1933, and Hurricane Isabel.

*Data courtesy of NOAA and Unisys weather.



Comparison of the storm tracks of Hurricane Isabel and the 1933 hurricane. Map courtesy of NOAA. RKN



Erosion damage at the UMCES Chesapeake Biological Laboratory in Solomons after 1933 hurricane. Image courtesy of Calum Marine Museum Archives.

Although Isabel's tidal surge was only slightly higher than the 1933 hurricane, anecdotal reports suggest that the flooding from Isabel was more severe than the 1933 storm, possibly as a result of the relative sea level rise of nearly one foot since then.^{1,10,11}

With a rate of relative sea level rise of almost double the global average, Chesapeake Bay will feel the effects of global sea level rise more acutely than other regions. Global warming is expected to be accompanied by an increase in the frequency and intensity of tropical storms such as hurricanes and this combined with relative sea level rise suggests that the aftermath of Isabel may foreshadow the effects of these storms in the future.

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The Integration and Application Network (IAN) is a collection of scientists interested in solving, not just studying, environmental problems. The intent of IAN is to examine, manage and produce timely syntheses and assessments of key environmental issues, with a special emphasis on Chesapeake Bay and its watershed. IAN is an initiative of the faculty of the University of Maryland Center for Environmental Science, but will link with other academic institutions, various resource management agencies and non-governmental organizations.

PRIMARY OBJECTIVES FOR IAN

- Foster problem-solving using integration of scientific data and information
- Support the application of scientific understanding to forecast consequences of environmental policy options
- Provide a rich training ground in complex problem solving and science application
- Facilitate a productive interaction between scientists and the broader community



FURTHER INFORMATION

SCIENCE COMMUNICATION
Prepared by Jane Thomas and J. Court Stevenson
Graphics, design and layout by Jane Thomas

AN: <http://umces.edu>
Or: Bill Davison: davison@umces.edu



Reminders

- Consider your audience
- Apply the general design principles
- Mock-up and review
- Consider your timeline

