Clear-Writing Workshop

November 14, 21, and 28

Eric Jandciu
jandciu@mail.ubc.ca

33⅓% of the mice used in this experiment were cured by the test drug; 33⅓% of the test population were unaffected by the drug and remained in a moribund condition; the third mouse got away.

– Erwin Neter
Editor-in-chief, *Infection and Immunity*

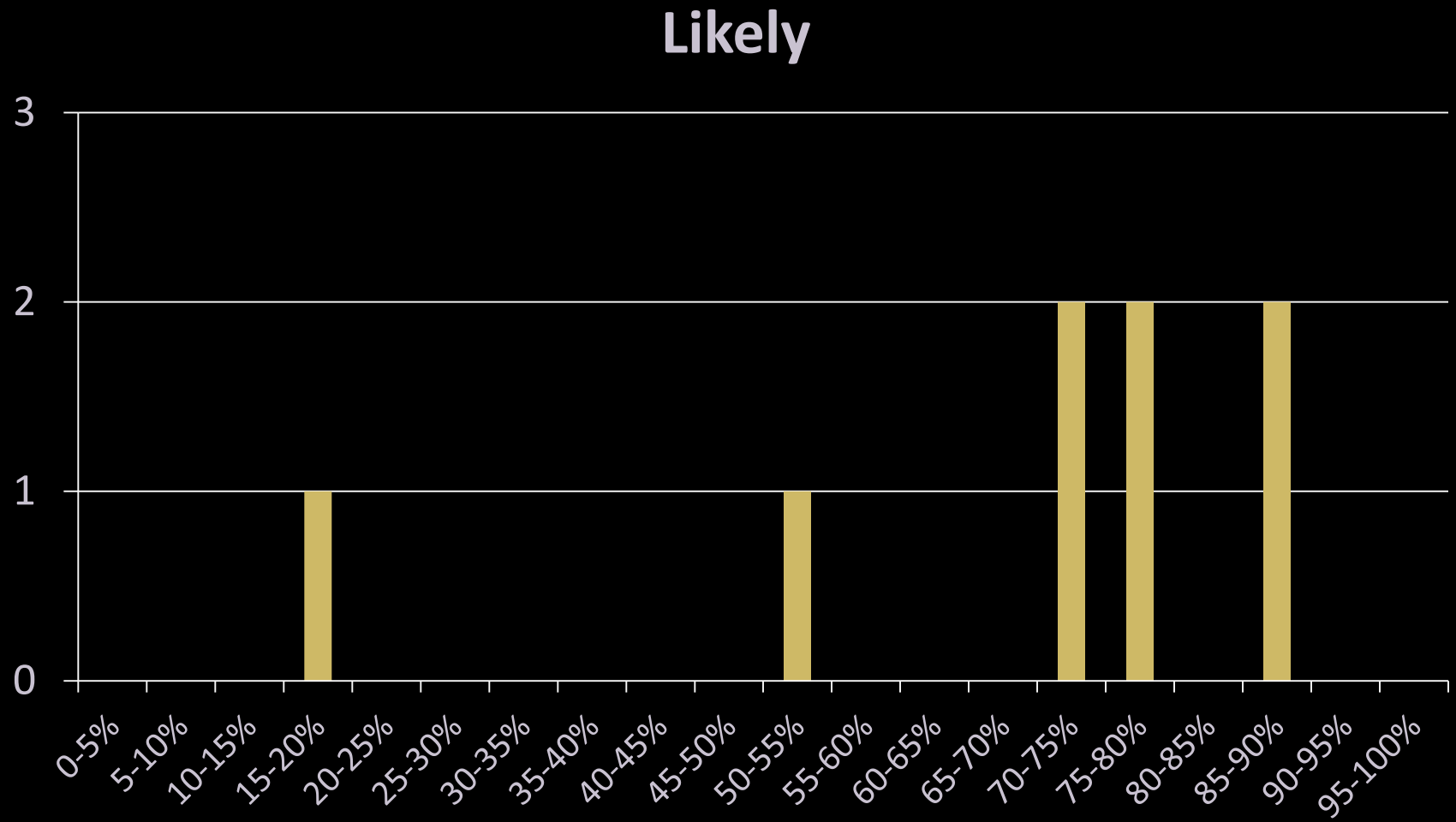
Outline

Day 1: Knowing your audience, avoiding jargon, using the active voice

Day 2: Simpler writing, concise writing, communicating uncertainty (part 1), making good comparisons, giving feedback (part 1)

Day 3: Communicating uncertainty (part 2), Giving feedback (part 2: peer review session), ordering information and engaging your readers

Communicating uncertainty



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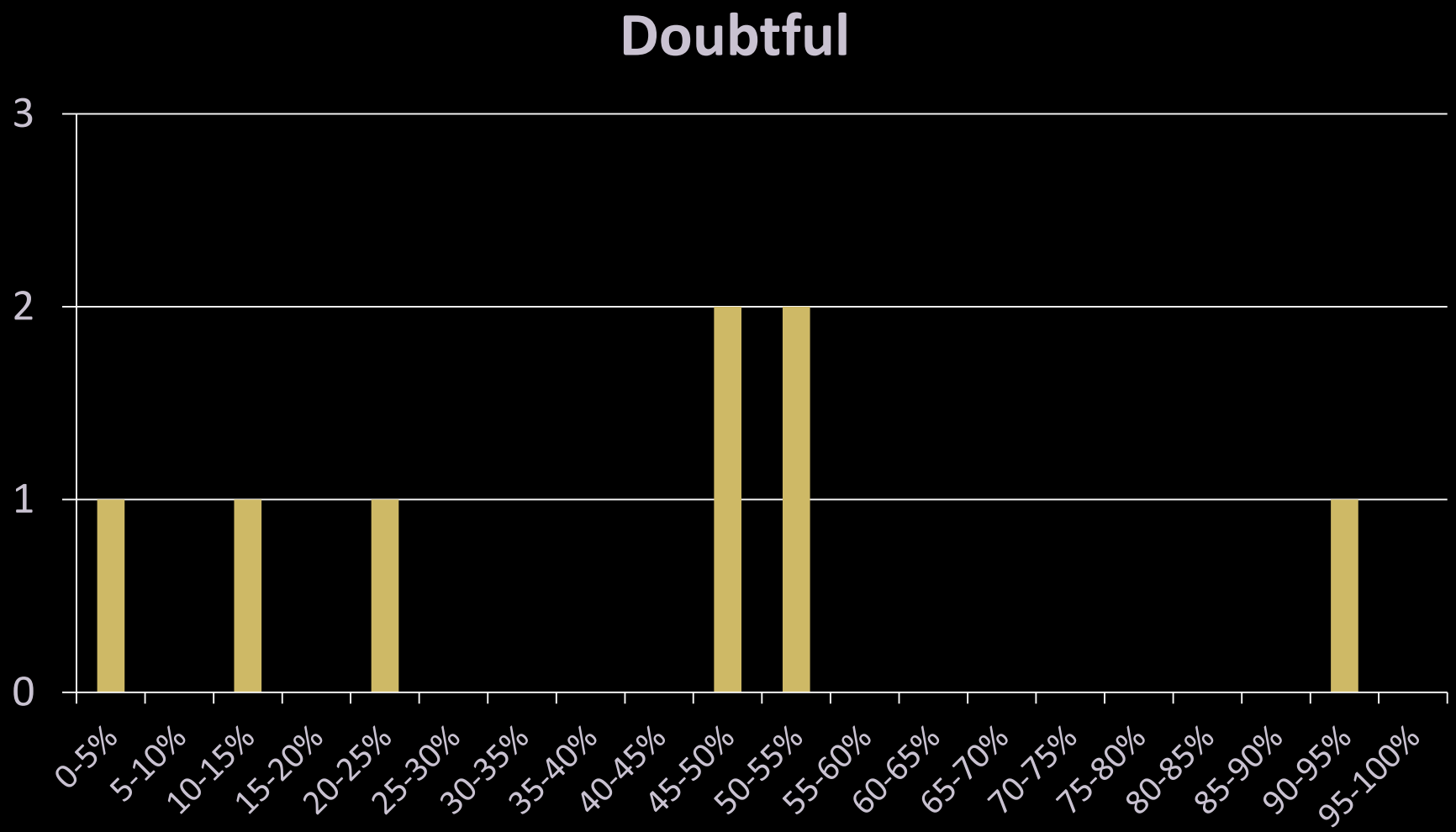

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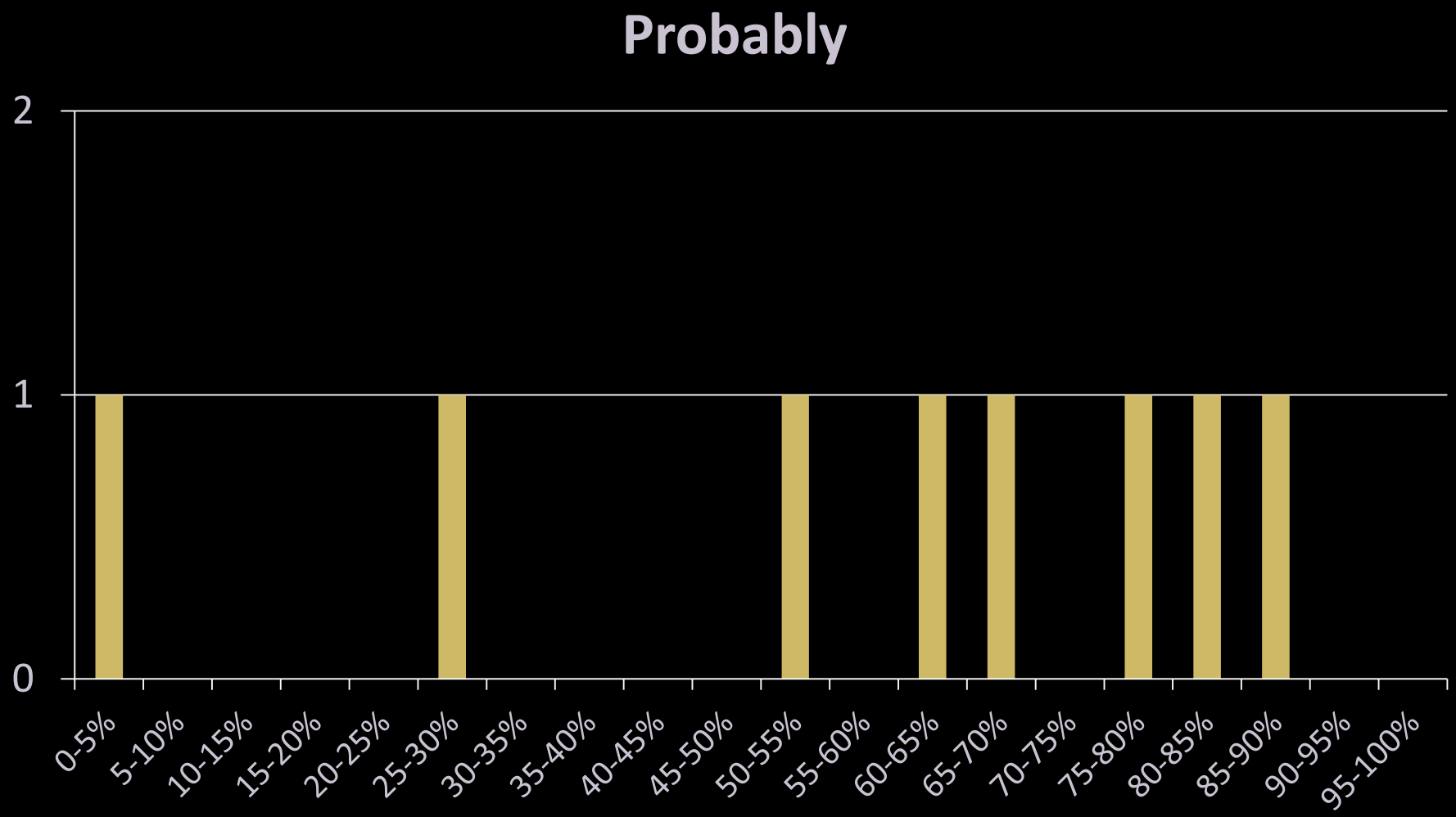

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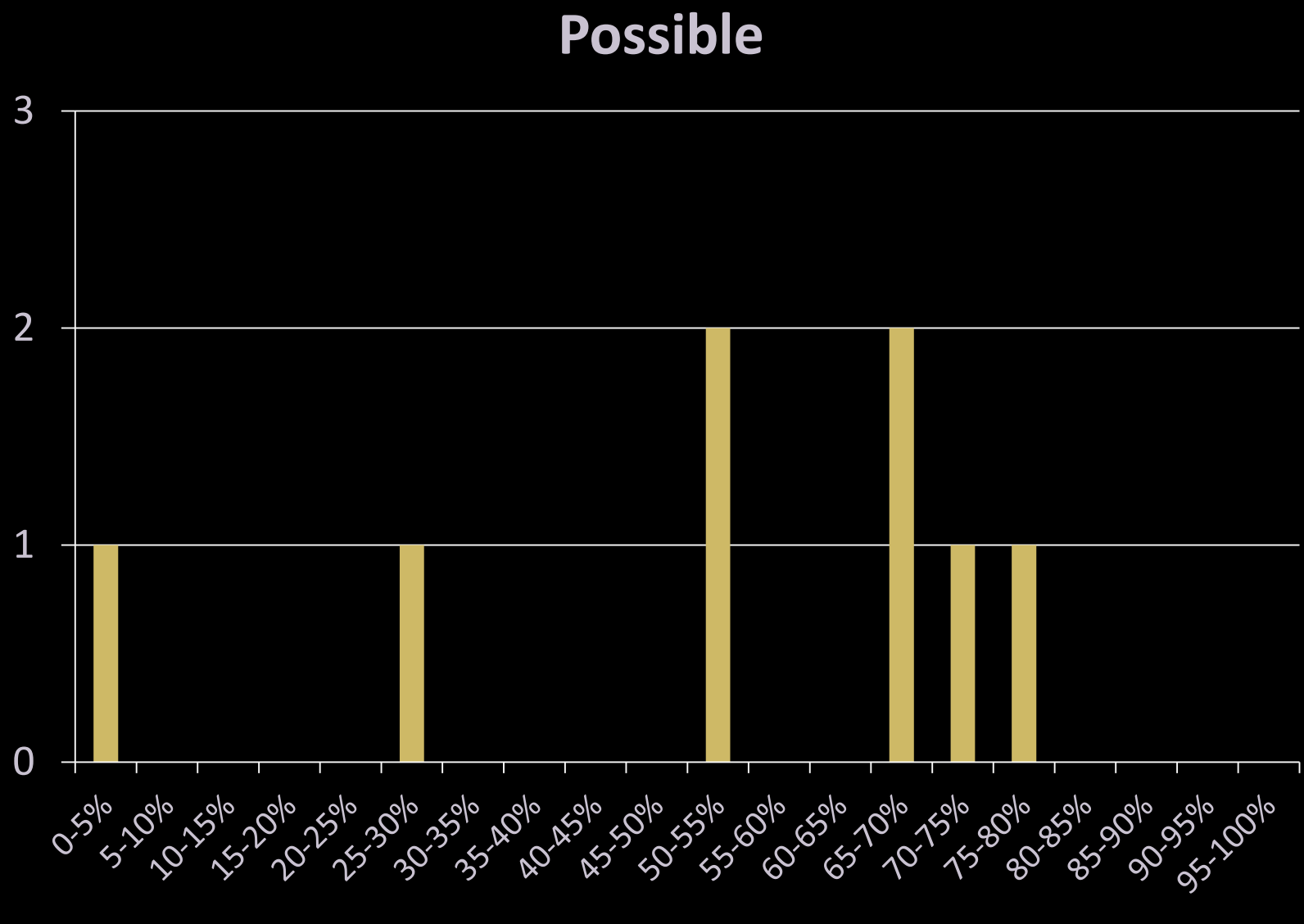

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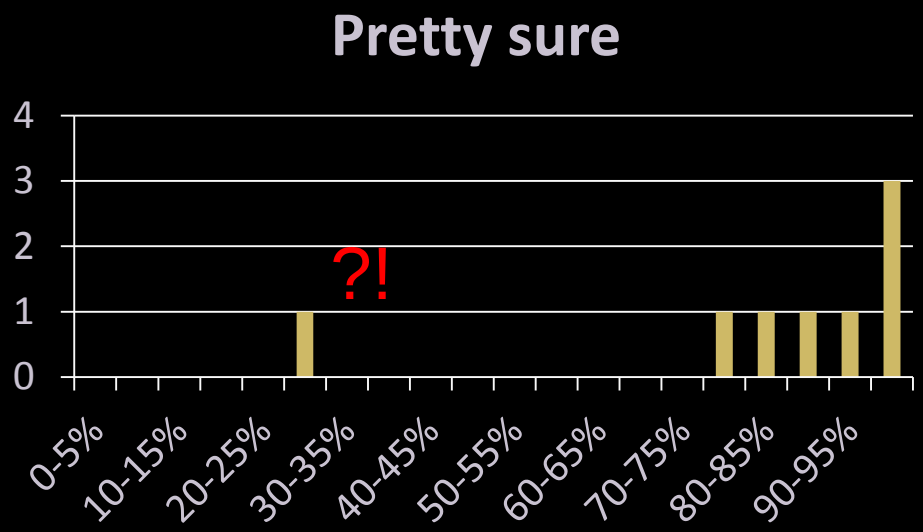
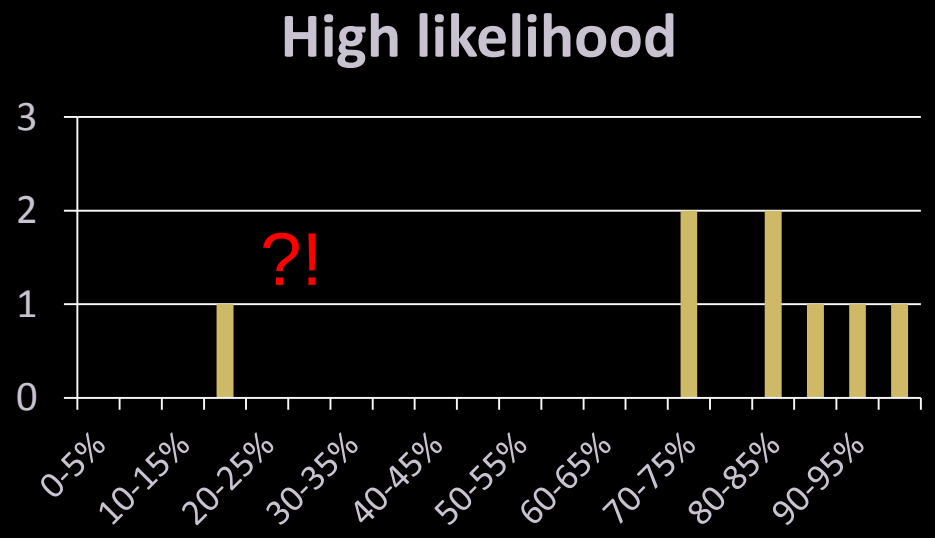




Communicating uncertainty

- Use the actual #'s
- "data suggest(s)"
- Give some timelines : esp. with_funding
  - emotional
  - health
- Ack other interpretations
  - we say this ... but others ...
- Ack limitations of study

Communicating uncertainty: strategies

Know your audience: how numerate?

Avoid framing bias

Communicating uncertainty

Heart surgeries in the UK have a 90% survival rate, while those in the USA have a 10% death rate.

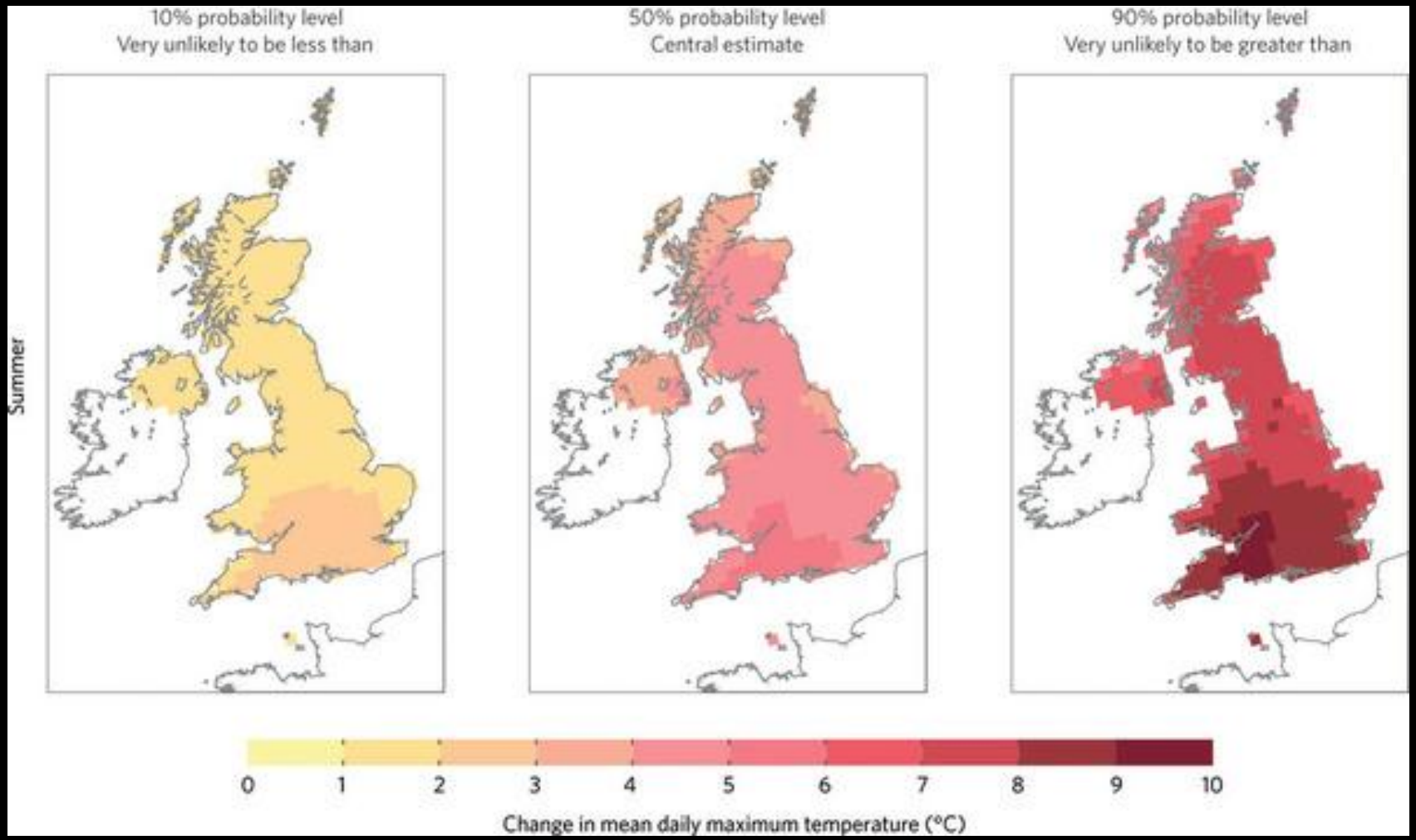
Communicating uncertainty: strategies

Know your audience: how numerate?

Avoid framing bias

Use figure(s)

Communicating uncertainty



Pidgeon, N. and Fischhoff, B. Nature Climate Change 1, 35–41 (2011)

Communicating uncertainty: strategies

- Know your audience: how numerate?
- Avoid framing bias
- Use figure(s)
- Use multiple means, including figures
- Give details of statistical tests
- Give timelines: when is uncertainty expected to be resolved? What needs to happen to resolve uncertainty?

Peer review: Pairing 1

Avneet Brar	Christopher Roach
Braham Dhillon	Chris Keeling
Padmini Herath	Marta Guarna
Ranga Nandanavanam	Maria Luisa Diaz (miss 28th)
Jose Celedon	Christine Chiu
Kahlil Baker	Qing Wang

Peer review: Pairing 2

Please just exchange your reviews.

Peer review: general comments?

What do you mean? Jargon.

Importance of someone else reading

Which tense?

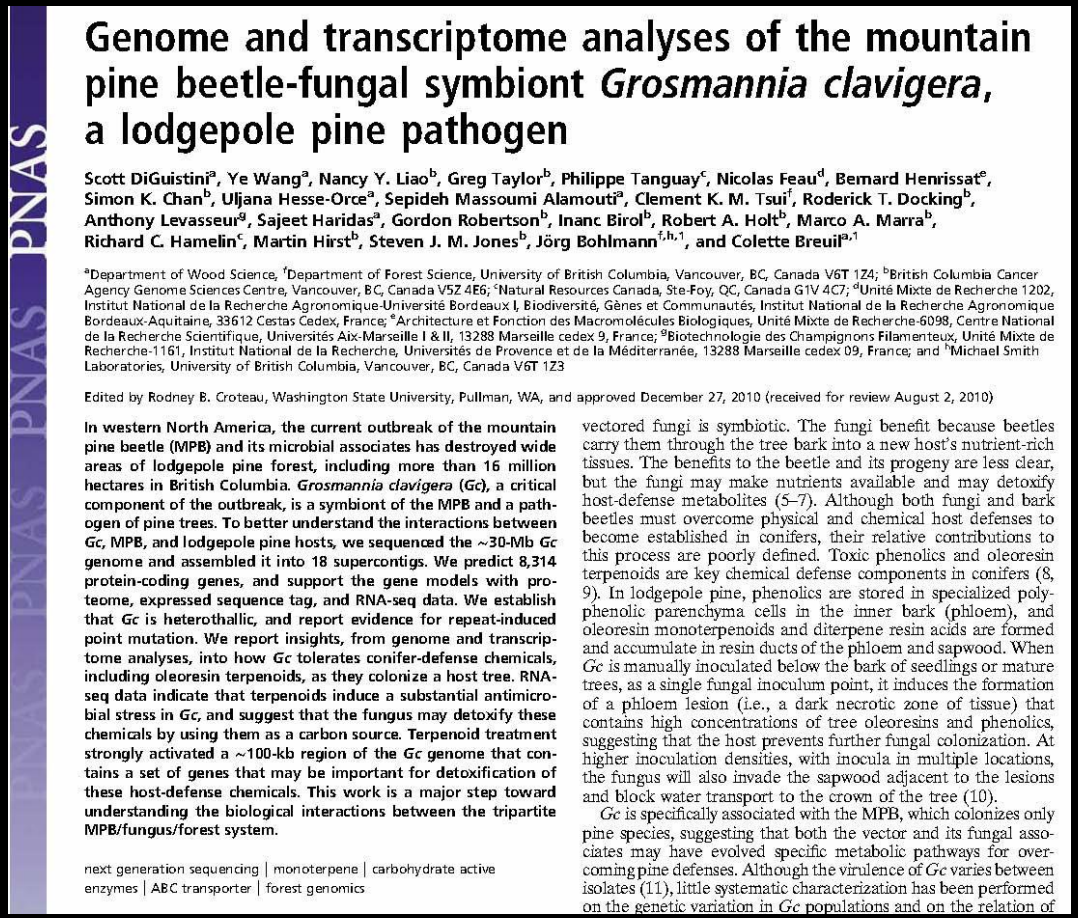
Careful with word choice - diff meanings
- only used in science.

Information ordering

Many scientists assume that what professional scientists care about will also fascinate readers. Generally, though, this is not the case.

- Daniel Goleman
Science reporter, *New York Times*

TURN IT UPSIDE DOWN!!



PNAS PNAS PNAS PNAS

Genome and transcriptome analyses of the mountain pine beetle-fungal symbiont *Grosmannia clavigera*, a lodgepole pine pathogen

Scott DiGuistini[a], Ye Wang[a], Nancy Y. Liao[b], Greg Taylor[b], Philippe Tanguay[c], Nicolas Feau[d], Bernard Henrissat[e], Simon K. Chan[b], Uljana Hesse-Orce[a], Sepideh Massoumi Alamouti[a], Clement K. M. Tsui[f], Roderick T. Docking[b], Anthony Levasseur[a], Sajeet Haridas[a], Gordon Robertson[b], Inanc Birol[b], Robert A. Holt[b], Marco A. Marra[b], Richard C. Hamelin[c], Martin Hirst[b], Steven J. M. Jones[b], Jörg Bohlmann[f,h,1], and Colette Breuil[a,1]

[a]Department of Wood Science, [f]Department of Forest Science, University of British Columbia, Vancouver, BC, Canada V6T 1Z4; [b]British Columbia Cancer Agency Genome Sciences Centre, Vancouver, BC, Canada V5Z 4E6; [c]Natural Resources Canada, Ste-Foy, QC, Canada G1V 4C7; [d]Unité Mixte de Recherche 1202, Institut National de la Recherche Agronomique-Université Bordeaux I, Biodiversité, Gènes et Communautés, Institut National de la Recherche Agronomique Bordeaux-Aquitaine, 33612 Cestas Cedex, France; [e]Architecture et Fonction des Macromolécules Biologiques, Unité Mixte de Recherche-6098, Centre National de la Recherche Scientifique, Universités Aix-Marseille I & II, 13288 Marseille cedex 9, France; [g]Biotechnologie des Champignons Filamenteux, Unité Mixte de Recherche-1161, Institut National de la Recherche, Universités de Provence et de la Méditerranée, 13288 Marseille cedex 09, France; and [h]Michael Smith Laboratories, University of British Columbia, Vancouver, BC, Canada V6T 1Z3

Edited by Rodney B. Croteau, Washington State University, Pullman, WA, and approved December 27, 2010 (received for review August 2, 2010)

In western North America, the current outbreak of the mountain pine beetle (MPB) and its microbial associates has destroyed wide areas of lodgepole pine forest, including more than 16 million hectares in British Columbia. *Grosmannia clavigera* (*Gc*), a critical component of the outbreak, is a symbiont of the MPB and a pathogen of pine trees. To better understand the interactions between *Gc*, MPB, and lodgepole pine hosts, we sequenced the ~30-Mb *Gc* genome and assembled it into 18 supercontigs. We predict 8,314 protein-coding genes, and support the gene models with proteome, expressed sequence tag, and RNA-seq data. We establish that *Gc* is heterothallic, and report evidence for repeat-induced point mutation. We report insights, from genome and transcriptome analyses, into how *Gc* tolerates conifer-defense chemicals, including oleoresin terpenoids, as they colonize a host tree. RNA-seq data indicate that terpenoids induce a substantial antimicrobial stress in *Gc*, and suggest that the fungus may detoxify these chemicals by using them as a carbon source. Terpenoid treatment strongly activated a ~100-kb region of the *Gc* genome that contains a set of genes that may be important for detoxification of these host-defense chemicals. This work is a major step toward understanding the biological interactions between the tripartite MPB/fungus/forest system.

next generation sequencing | monoterpene | carbohydrate active enzymes | ABC transporter | forest genomics

vectored fungi is symbiotic. The fungi benefit because beetles carry them through the tree bark into a new host's nutrient-rich tissues. The benefits to the beetle and its progeny are less clear, but the fungi may make nutrients available and may detoxify host-defense metabolites (5–7). Although both fungi and bark beetles must overcome physical and chemical host defenses to become established in conifers, their relative contributions to this process are poorly defined. Toxic phenolics and oleoresin terpenoids are key chemical defense components in conifers (8, 9). In lodgepole pine, phenolics are stored in specialized polyphenolic parenchyma cells in the inner bark (phloem), and oleoresin monoterpenoids and diterpene resin acids are formed and accumulate in resin ducts of the phloem and sapwood. When *Gc* is manually inoculated below the bark of seedlings or mature trees, as a single fungal inoculum point, it induces the formation of a phloem lesion (i.e., a dark necrotic zone of tissue) that contains high concentrations of tree oleoresins and phenolics, suggesting that the host prevents further fungal colonization. At higher inoculation densities, with inocula in multiple locations, the fungus will also invade the sapwood adjacent to the lesions and block water transport to the crown of the tree (10).

Gc is specifically associated with the MPB, which colonizes only pine species, suggesting that both the vector and its fungal associates may have evolved specific metabolic pathways for overcoming pine defenses. Although the virulence of *Gc* varies between isolates (11), little systematic characterization has been performed on the genetic variation in *Gc* populations and on the relation of

Ba Re Ba Re

↓

Su Re Su Re

↓

Su Re Su Re

http://www.pnas.org/content/108/6/2504

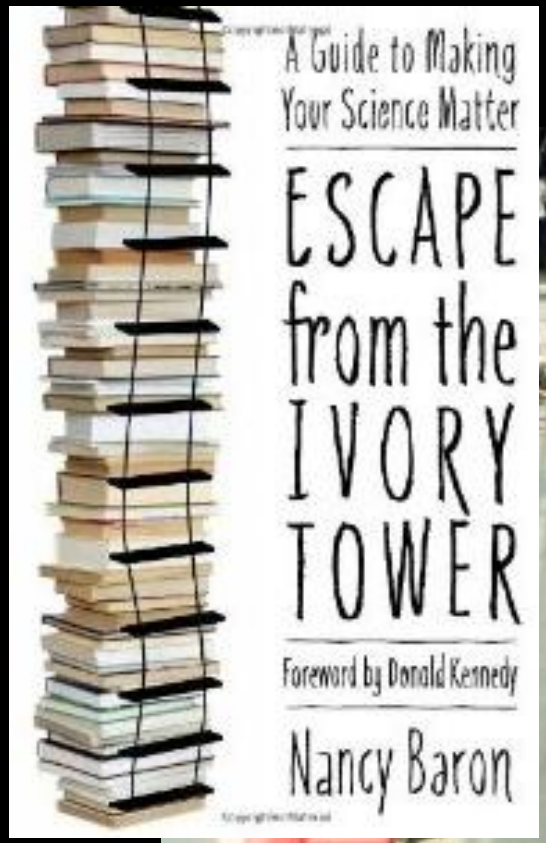


Photo: NASA Goddard Space Flight Center via flickr

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Sydney A. Vergis[1], Joshua H. Viers, Anne W. Millington, Joshua H. Johnson, James F. Quinn

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This poses a problem for geographic information gathering -- especially with regard to the specific science behind ecosystem restoration. Without a solid grasp on the actual names and locations of features being described, the propensity for data loss and overlap becomes high. Here we describe our applied research in using geographical information systems (GIS) to document local geographic naming in the Cosumnes River floodplain. Our efforts to locate and catalog place names will assist in the management and monitoring of ecological restoration efforts by improving communication through a standardized spatial framework.

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University of California - Davis

• The Study Area •

The Cosumnes River watershed is 3,108 square kilometers in area and supports the Cosumnes River (~128.75 km), a relatively low elevation undammed watershed on the west slope of the Sierra Nevada. Given the uniqueness of this area, it is vital that the CALFED Bay-Delta's goal of ecosystem restoration is met through an informed management process.

To establish a proper historical ecological context of the conditions in the Cosumnes River, as it enters the Delta, this study documents the temporal, semantic, and locational trends of toponyms in the region. Establishing goals, objectives, actions, and monitoring protocols for an adaptive management plan necessitates a working foundation of knowledge about a particular area, especially with regard to social and ecological values, and the historical context of these variables.

• Geographic Names as a Function of Ecological History •

Names convey a sense of place, and this study sought to find correlations between a simple sense of place and a scientific foundation of place with the goal of assisting resource managers with the tools necessary to understand the ecological trends of the Cosumnes River. Understanding the origin and meaning behind a semantic identifier can be a vital tool for resource managers in constructing management goals.

This particular study documented several trends with regard to names and their locations. For example, toponym origins are significantly correlated to USGS National Land Cover Data Classifications (i.e., Agriculture, Barren, Developed, Forest, Grassland, Water, and Wetlands).

We identified place names using a variety of sources, including topographic maps (1894-1975) and published works (e.g., Gudde 1947). These place names were digitized in ArcGIS8.3 in geodatabase format. Subsequently, we divided origin of place name into four classifications: Landscape Based (e.g., Oak Park), Historical Reference (e.g., Thornton), Management Scheme (e.g., Hastings Landing), and Unknown (e.g., Desmond Road). We also coded temporal origin into 5 classes: (1) Pre-history (prior to 1850); (2) Gold Rush (1850-1900); (3) Pre-War (1900-1950); (4) Post- War (1950-2000); and Recent human activity (post 2000). We analyzed these data as a function of feature type (Natural, Urban, or Quasi) to determine which trends, if any, could be ascribed to place name origin or time period.

Data was gathered for a total of 570 place names in the Cosumnes Area.

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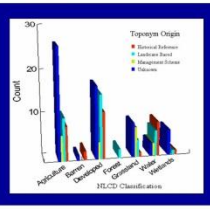
568	Bethel Island	GoldRush	-1	0.00	4.32	.15	1.22	Quasi	Management Scheme	True



Test	Type of Test	Probability
Toponym Origin by NLCD Land Classification	Contingency Analysis	0.0086

A contingency analysis of the Toponym Origin and NLCD Classification reveal that Agricultural, Developed, and Forest lands have names that are more likely to be based on the landscape; Barren lands and Water bodies are more likely to be based on historical references; Grasslands are more likely to be rooted in a management scheme; and Wetlands are equally as likely to be rooted in a historical reference or be landscape based.

A side-by-side comparison of maps from 1894, 1910, and 1975 can present resource managers with some notion of the historical conditions of Cosumnes area. In the intervening 80 years, one can see significant alterations in the physical landscape; particular elements of change include flood plain habitats. This toponym-based project serves to examine the historical ecology of the Cosumnes and the Delta by including political and social factors, as reflected in semantic trends.

• Conclusions •

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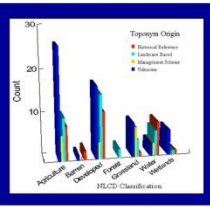

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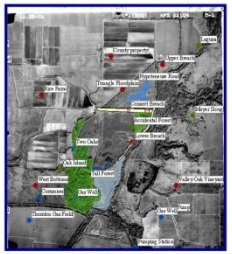

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Feature ID	Toponym Name	Temporal Origin	Elevation (m)	Slope (%)	Urban Distance (km)	Road Distance (km)	River Distance (km)	USGS Categories	Toponym Origin	Above/At (True) or Below (False) Mean Sea Level	
181	Stone Lake	PreWar	1	0.59	7.97	.87	1.07	Natural	Landscape Based	False	
223	Wright Cut	Unknown	1	0.00	17.97	.86	.18	Natural	Management Scheme	False	
348	Deverton Creek	Unknown	0	0.83	5.24	.85	.03	Natural	Historical Reference	True	
97	Oak Park	PostWar	14	1.86	7.86	0.00	1.42	Urban	Landscape Based	False	
616	Pittsburg	PreWar	7	1.18	0.00	.03	.46	Urban	Management Scheme	False	
105	Galt	Goldrush	16	1.32	7.48	0.00	.87	Urban	Historical Reference	False	
25	Mokelumne City	Goldrush	0	1.18	11.38	.12	.084	Quasi	Historical Reference	True	
568	Bethel Island	Goldrush	-1	0.00	4.32	.15	1.22	Quasi	Management Scheme	True	

Toponym Origin by NLCD Land Classification	Contingency Analysis:	0.2084
Test	Type of Test	Probability

A contingency analysis of the Toponym Origin and NLCD Classification reveal that Agricultural, Developed, and Forest lands have names that are more likely to be based on the landscape; Barren lands and Water bodies are more likely to be based on historical references; Grasslands are based on historical reference or management scheme; and Wetlands are equally as likely to be rooted in a historical reference or be landscape based.

• Conclusions •

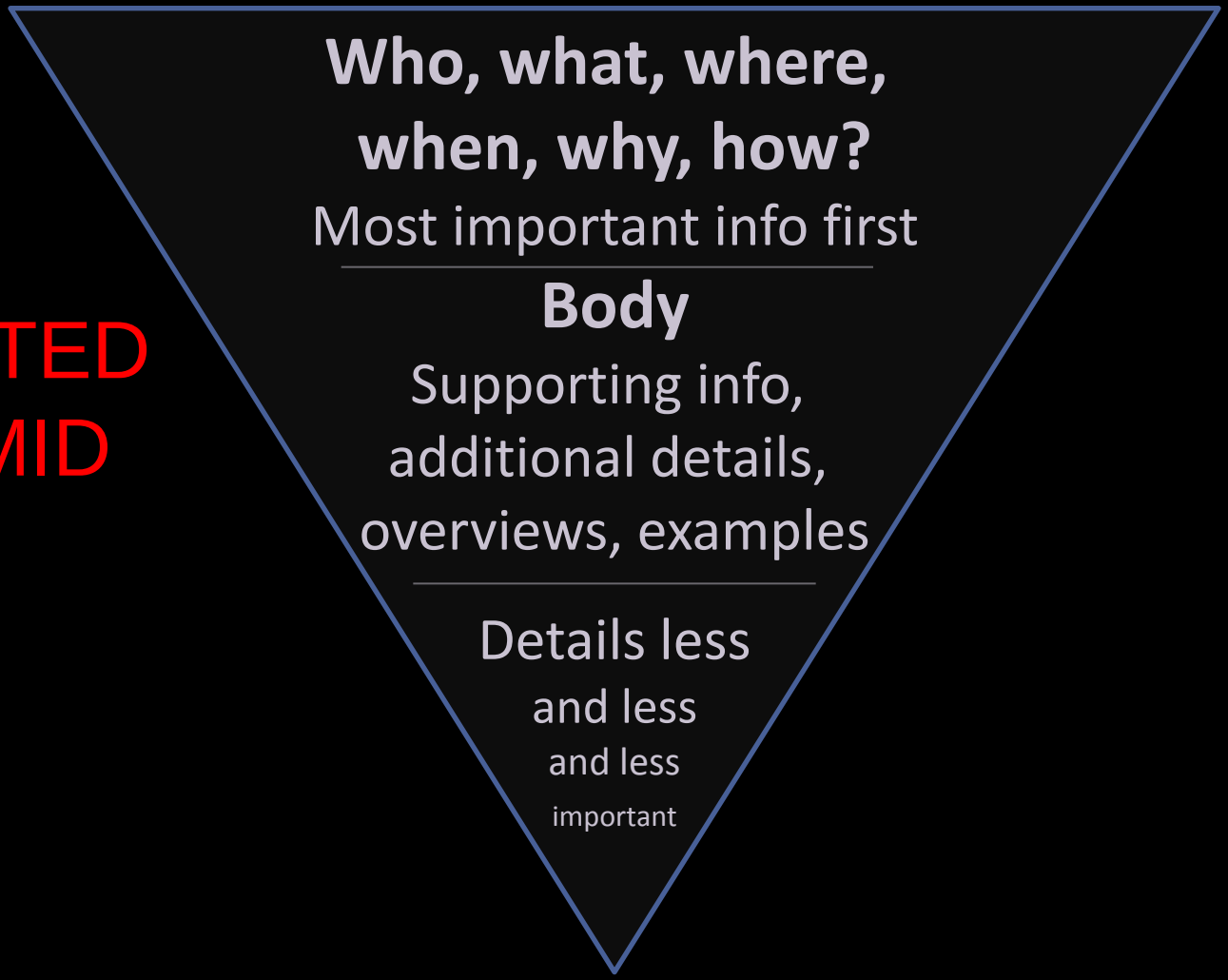
- The conceptual framework of place is based on a number of categories: whether it is temporal origin, the positioning of features themselves, or the origins of place names. These categories convey significant information regarding the natural surroundings and the dynamics of local culture. The significance in using geographic information systems to record and analyze the trends in human interaction with the natural landscape lies in the importance of reconciling natural resource management techniques with the undertones of culture, nature, ecology, and economy. These elements are in turn contained in the location(al, scal, and political nuances of urban and natural features and places.
- In order for managers to be able to set goals which align with the local, ecological landscape, they must have a contextual frame of reference for assessing modern patterns and processes from historical patterns and examining both the ecological landscape and its human interactivity.

A side-by-side comparison of maps from 1894, 1910, and 1975 can present resource managers with some notion of the historical conditions of Cosumnes area. In the intervening 80 years, one can see significant alterations in the physical landscape; particular elements of change include flood plain habitats. This toponym-based project serves to examine the historical ecology of the Cosumnes and the Delta by including political and social factors, as reflected in semantic trends.

Information Center for the Environment
University of California - Davis

Image: Sydney A. Vergis, Joshua H. Viers, Anne W. Millington, Joshua H. Johnson, James F. Quinn

INVERTED PYRAMID



In western North America the mountain pine beetle—the most destructive of the many species collectively known as bark beetles—is on a pine tree-killing spree. Since the 1990s swarms of the tiny killer, spurred in part by a streak of relatively mild winters that don't kill the insect, along with dry summers that leave trees more vulnerable to attack, have destroyed huge swaths of pine forests—around 16 million hectares (an area larger than Florida) in British Columbia alone.

The beetles are now threatening to move eastward, and research ecologists are working to rapidly build a better understanding of exactly how the insect invasion kills trees, searching for insights that might allow forestry workers better cope with the epidemic.

http://www.scientificamerican.com/article.cfm?id=mountain-pine-beetle-fungus

Example

Questions?

Writing toolkit

Know your audience

Avoid jargon

Use the active voice (when appropriate)

Use simpler words and concise phrases

Watch for ambiguity

Use analogy (metaphor, simile, etc.)

Use care when communicating uncertainty

Place most relevant information at the top

Proofread, proofread, proofread!