



# Writing and Publishing a Scientific Paper: an Insider's Guide

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EDITOR, *THE JOURNAL OF RAPTOR RESEARCH*



Would you rather....



or





“Your study is not complete until it has been published. In a way, the research project really never even took place unless the results are published in a scientific journal.”

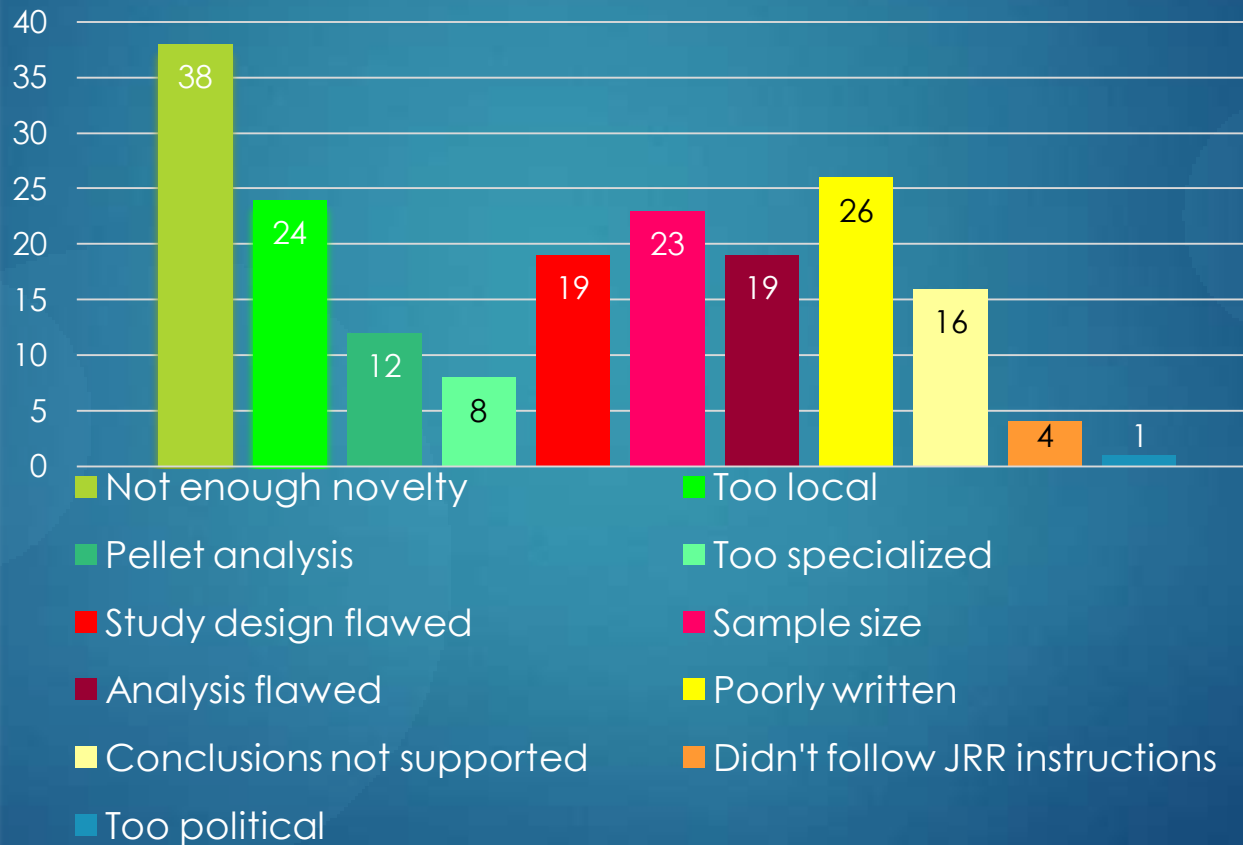
Jim Bednarz, 2007



## Successful publication: Learning from rejections

### Reasons for rejection at JRR

Number of  
manuscripts



32% of  
rejected  
papers  
have  
problems  
with  
design  
and  
analysis

2008-2012



# Successful Publishing

## 1. Design your study with the end in mind

32% of rejected manuscripts have a major flaw in study design, flawed data analysis, or sample size too small.

It is important to think about your papers before you start research



What question do you want to answer?



What would make a “publishable unit”?



Where is my biostatistician?



## STUDY DESIGN: WHAT TO CONSIDER

- Sample size



Raptors are

- Fascinating predators
- Appealing to the public
- Good research models for some ecological questions

But they

- Have low densities
- Are secretive
- Can be difficult to find
- Can be difficult to access





## STUDY DESIGN: WHAT TO CONSIDER

- Sample size



One nest:  
500 hours of  
observation

Vs.



Ten nests: 25 hours each



## STUDY DESIGN: WHAT TO CONSIDER

- Sample size

### Typical sample size in Journal of Raptor Research

Type of study	Mean sample size	Range
Telemetry	19.8 $\pm$ 5.0 individuals	7 - 63
Habitat	31.3 $\pm$ 6.9 nests	12 - 62
Diet	15.9 $\pm$ 2.5 nests or roosts	4 - 44
Morphometrics	137 $\pm$ 54 individuals	35 - 592
Reproductive rate	372 $\pm$ 174 breeding attempts Median = 84	28 - 1198

Source: articles from JRR Volumes 45 - 47

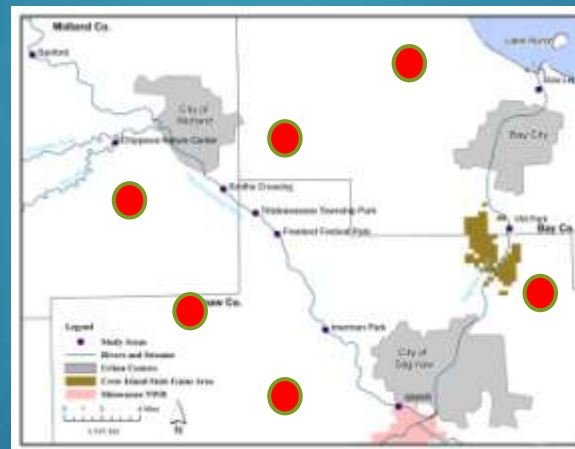




## STUDY DESIGN: WHAT TO CONSIDER

- Sample size
- Pseudoreplication

The use of traditional null-hypothesis statistics to test for effects in experiments in which the replicates are not independent or the treatments are not replicated (adapted from Bednarz 2007).



Nests studied in 2008

- Sample size
- Pseudoreplication

 2008  
 2009

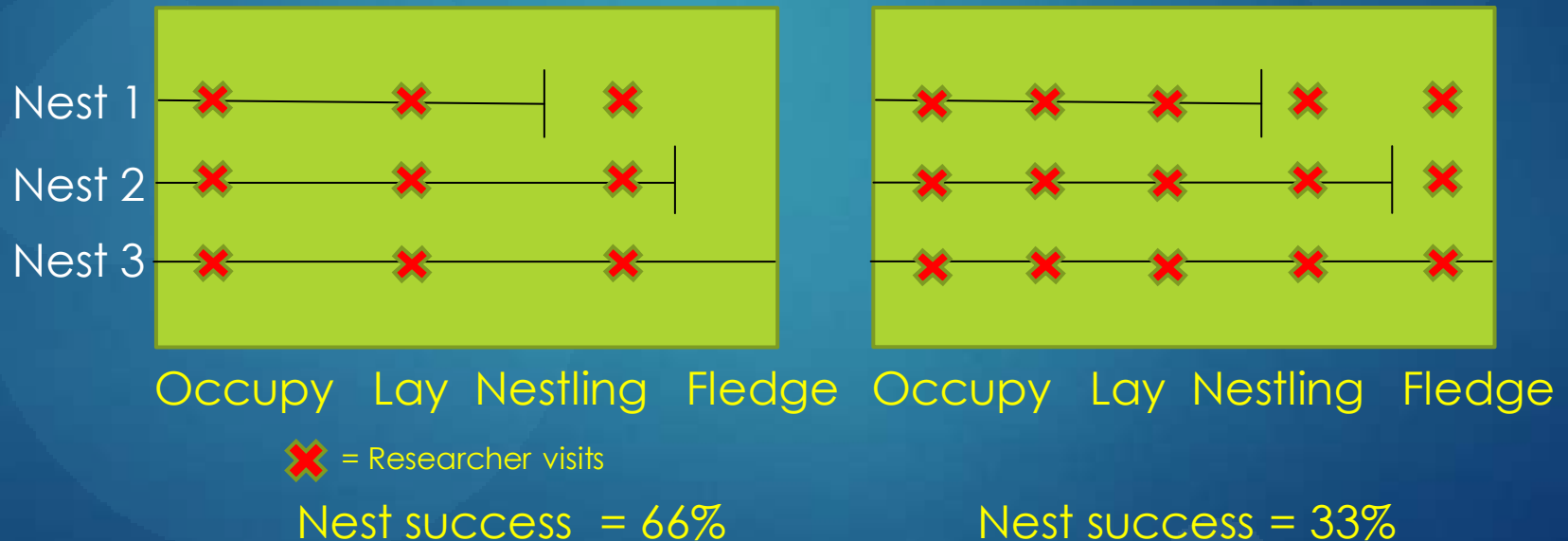




## STUDY DESIGN: WHAT TO CONSIDER

- Sample size
- Pseudoreplication
- Procedural inconsistency

### Apparent Nest Success with differing methodologies

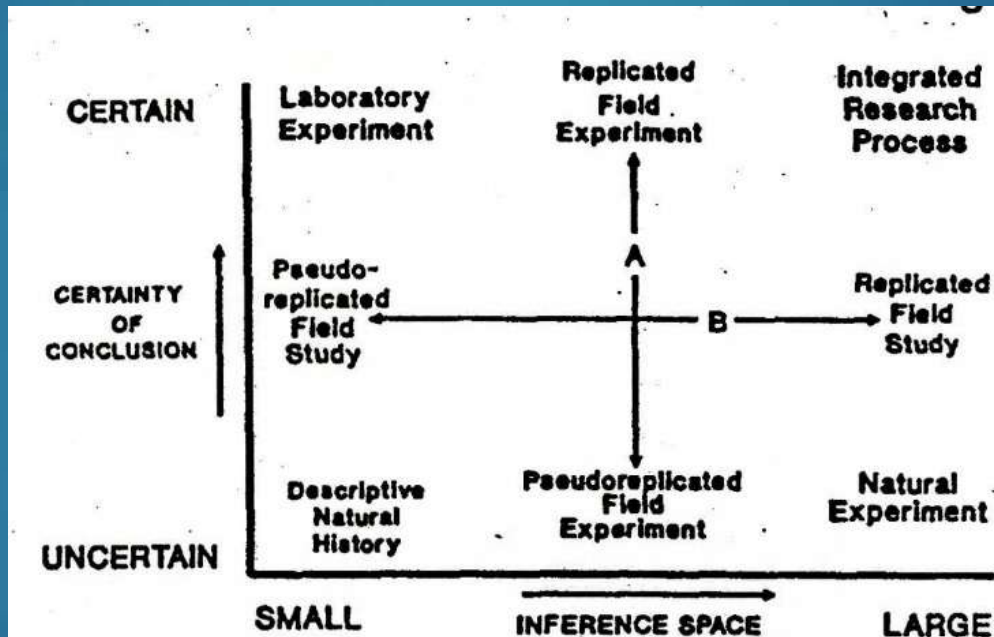




# Successful Publishing

1. Design your study with the end in mind
2. Analyze appropriately

Appropriate analysis starts with understanding study design



*Fig. 1.* The potential for wildlife study designs to produce conclusions with high certainty (few alternate hypotheses likely) and widespread applicability (a diversity of research populations where inferences apply).

From Ratti, J.T. and E.O. Garton 1994. Research and Experimental Design. Pages 1-23 in Research and Management Techniques for Wildlife and Habitat, T.A. Bookhout (Ed.)



# Successful Publishing

1. Design your study with the end in mind
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## Classic hypothesis testing (traditional null-hypothesis testing)

Table 1. Male American Kestrel nestlings that received three previous ectoparasite removals (13 experimental broods) had lower *Carnus hemapterus* loads at 20–22 d than males not receiving previous removals (11 control broods), but did not differ significantly in size or body condition (body mass/wing length). Data from northwestern New Jersey, 2005. Values are means  $\pm$  SD.

VARIABLE	EXPERIMENTAL <sup>1</sup> BROODS	CONTROL BROODS	<i>U</i> <sup>2</sup>	<i>P</i>
Wing length <sup>3</sup> (mm)	66.4 $\pm$ 6.9	64.4 $\pm$ 8.5	56.0	0.621
Tail length <sup>4</sup> (mm)	43.2 $\pm$ 5.5	42.0 $\pm$ 6.8	53.5	0.761
Body mass (g)	129.8 $\pm$ 13.0	131.4 $\pm$ 16.6	42.5	0.595
Body mass/wing length (g/mm)	2.0 $\pm$ 0.2	2.1 $\pm$ 0.3	42.0	0.569
Number of <i>C. hemapterus</i> per nestling	1.3 $\pm$ 3.3	2.3 $\pm$ 2.5	26.0	0.035
Number of other parasites per nestling	0.1 $\pm$ 0.2	0.1 $\pm$ 0.2	48.5	0.455
Number of nonparasites	0.1 $\pm$ 0.1	0.2 $\pm$ 0.2	33.0	0.077

<sup>1</sup> Ectoparasites removed 5–7, 10–12, and 15–17 d after hatching.

<sup>2</sup> Mann-Whitney tests: two-tailed for size variables, one-tailed for ectoparasites.

<sup>3</sup> Right seventh primary.

<sup>4</sup> Right outer rectrix.

Lesko, M.J. and J.A. Smallwood. 2012. Ectoparasites of American Kestrels in northwestern New Jersey and their relationship to nestling growth and survival. JRR 46:304-313



# Successful Publishing

1. Design your study with the end in mind
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Other common types of analyses include information-theoretic approach, reporting estimates of effects (means and CIs), Bayesian inference approach, and specialized techniques.

Table 3. Selection of Cox proportional hazard models of covariate pairs of the length of dependence period of hacked juvenile captive-bred Harpy Eagles in Panama and Belize. Only models which were significant at  $P < 0.05$  and AIC weight greater than zero are listed.

MODELS	LR	P	AIC	$\Delta$ AIC	AIC WEIGHT
Age at release + sex + interaction	35.9	<0.001	113.21	0.00	0.19
Age at release + body mass + interaction	35.8	<0.001	113.33	0.12	0.18
Age at release + individual in hack box	32.4	<0.001	114.71	1.49	0.09
Age at release + body mass	32.1	<0.001	114.99	1.78	0.08
Age at release + sex	32.0	<0.001	115.10	1.89	0.07
Age at release + enclosure time	32.4	<0.001	115.15	1.94	0.07
Age at release + season	31.9	<0.001	115.29	2.07	0.07
Age at release + individual in hack box + interaction	32.6	<0.001	116.55	3.33	0.04
Age at release + enclosure time + interaction	32.3	<0.001	116.85	3.64	0.03
Age at release + season + interaction	31.9	<0.001	117.27	4.06	0.02

\* Likelihood ratio,

<sup>b</sup> Akaike's Information Criterion.



Campbell-Thompson, E. et al. 2012. JRR 46:158-167.

Consult a biostatistician before starting your research





# Successful Publishing

1. Design your study with the end in mind
2. Analyze appropriately
3. Choose the right journal
  - Check the target journal's website
  - Review the articles published in the target journal
  - Ask colleagues or the Editor

*J. Raptor Res.* 46(4):420–423

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## JOURNAL OF RAPTOR RESEARCH INFORMATION FOR CONTRIBUTORS

The *Journal of Raptor Research* (JRR) publishes original research reports and review articles about the biology of diurnal and nocturnal birds of prey. All submissions must be in English, but contributions from anywhere in the world are welcome. Manus-

editor should be notified if extenuating circumstances prevent a timely return of the manuscript.

Authors will receive proofs of their articles prior to publication. Proofs must be read carefully to correct any printer errors and returned within two days of



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Not  
helpful

*J. Raptor Res.* 46(4):420–423  
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JRR accepts manuscripts on 109 topics, from “anatomy and morphology” to “wintering ecology”



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  - Review the articles published in the target journal
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From the RRF website:

A peer-reviewed, international publication dedicated to the dissemination of scientific information about raptors, *The Journal of Raptor Research* publishes original research reports and review articles on the biology and conservation of diurnal and nocturnal raptors. Articles describing ecology, behavior, life history, conservation, or techniques are appropriate, as are reviews of published studies. International contributions are encouraged.



What type of research is published in JRR?

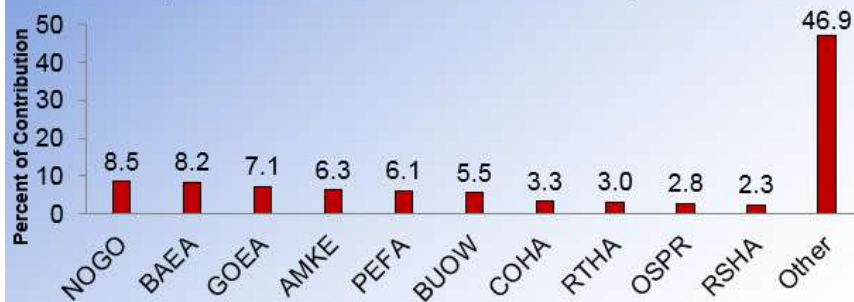
Study species and countries for papers published in JRR,  
1995 - 2010

### • J. Raptor Research

#### Top 10 species.

Total species represented: 166.

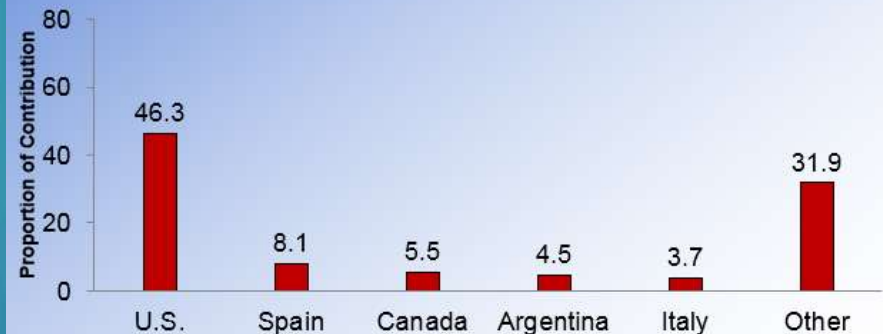
- Species contribution: Median: 0.2%, Mean 0.8%.



### • J. Raptor Research

#### Study Country ( $n = 706$ ).

Total countries represented = 69.



It is JRR's goal to increase the number of international papers

Source: Chiavacci, S.J., K.E. Pias, and J.F. Dwyer. 2011. From Duluth to Duluth: How has the focus of raptor research changed since 1995? Talk presented by James Dwyer at Raptor Research Foundation meeting, October 2011, Duluth, MN, USA

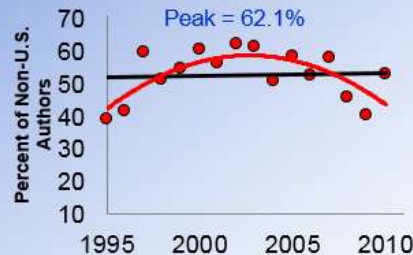


What type of research is published in JRR?

## Nationalities of authors of papers published in JRR, 1995 – 2010

### • J. Raptor Research % Non-U.S. Authors

- Peaked 2002
- $P < 0.008$
- $R^2 = 0.521$
- % 1995: 39.0
- % 2011: 52.9



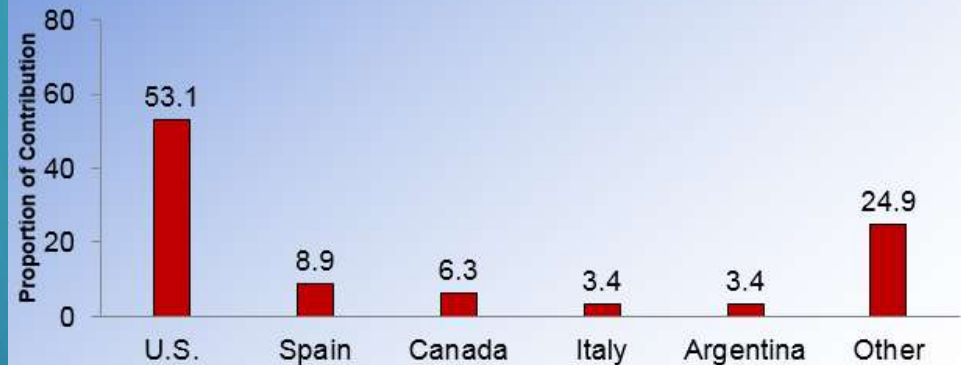
Source	DF	SS	MS	F Ratio
Model	2	445.119	222.599	7.068
Error	13	409.420	31.494	
C. Total	15	854.619		

$Y = 0.091(\text{year}) - 122.536$

### • J. Raptor Research

**Nationality of First Authors** ( $n = 800$ ).

Total countries represented 54.

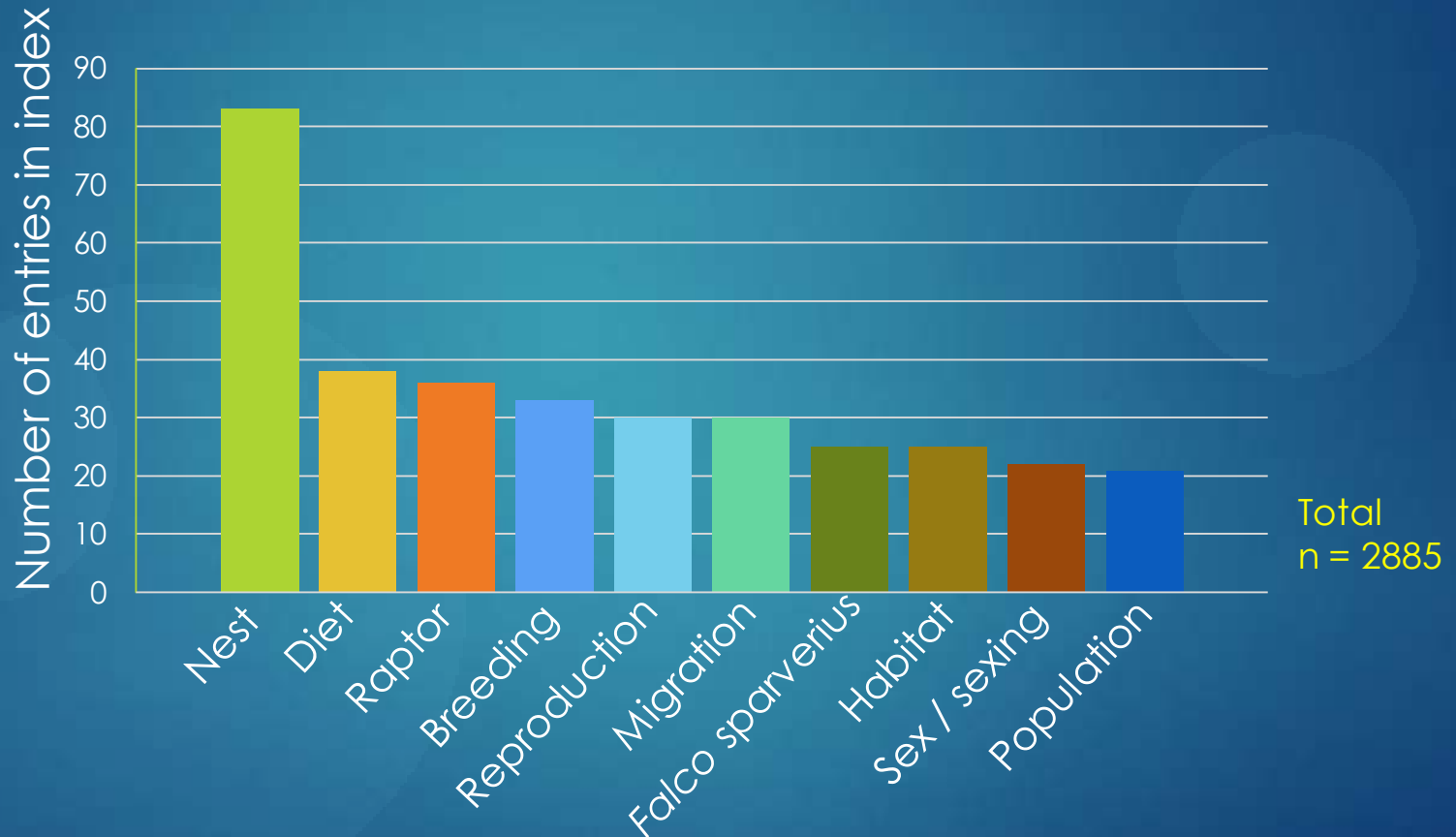


Source: Chiavacci, S.J., K.E. Pias, and J.F. Dwyer. 2011. From Duluth to Duluth: How has the focus of raptor research changed since 1995? Talk presented by James Dwyer at Raptor Research Foundation meeting, October 2011, Duluth, MN, USA



What type of research is published in JRR?

Most common key words indexed in JRR, 2009 - 2013



\*Terms include all forms of the word; e.g., nest = nest, nesting, nest-site, etc.

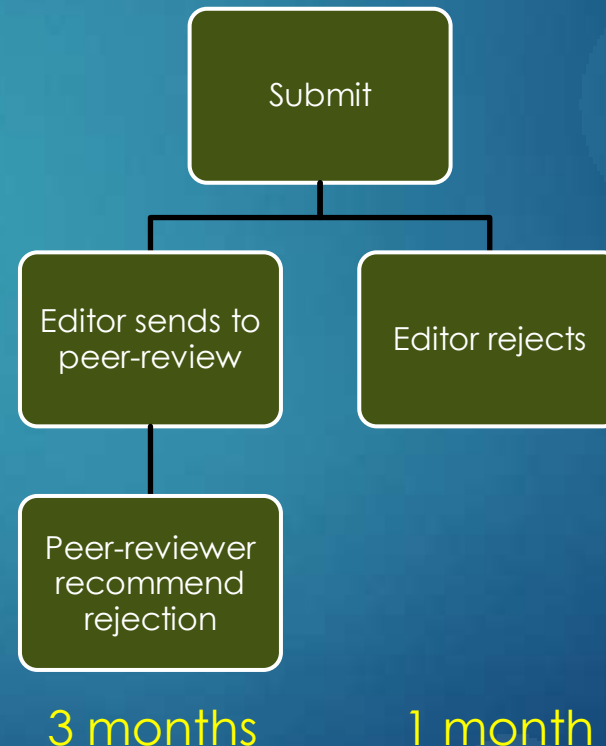




# Successful Publishing

1. Design your study with the end in mind
2. Analyze appropriately
3. Choose the right journal

Choosing the wrong journal wastes your time and that of the editorial staff

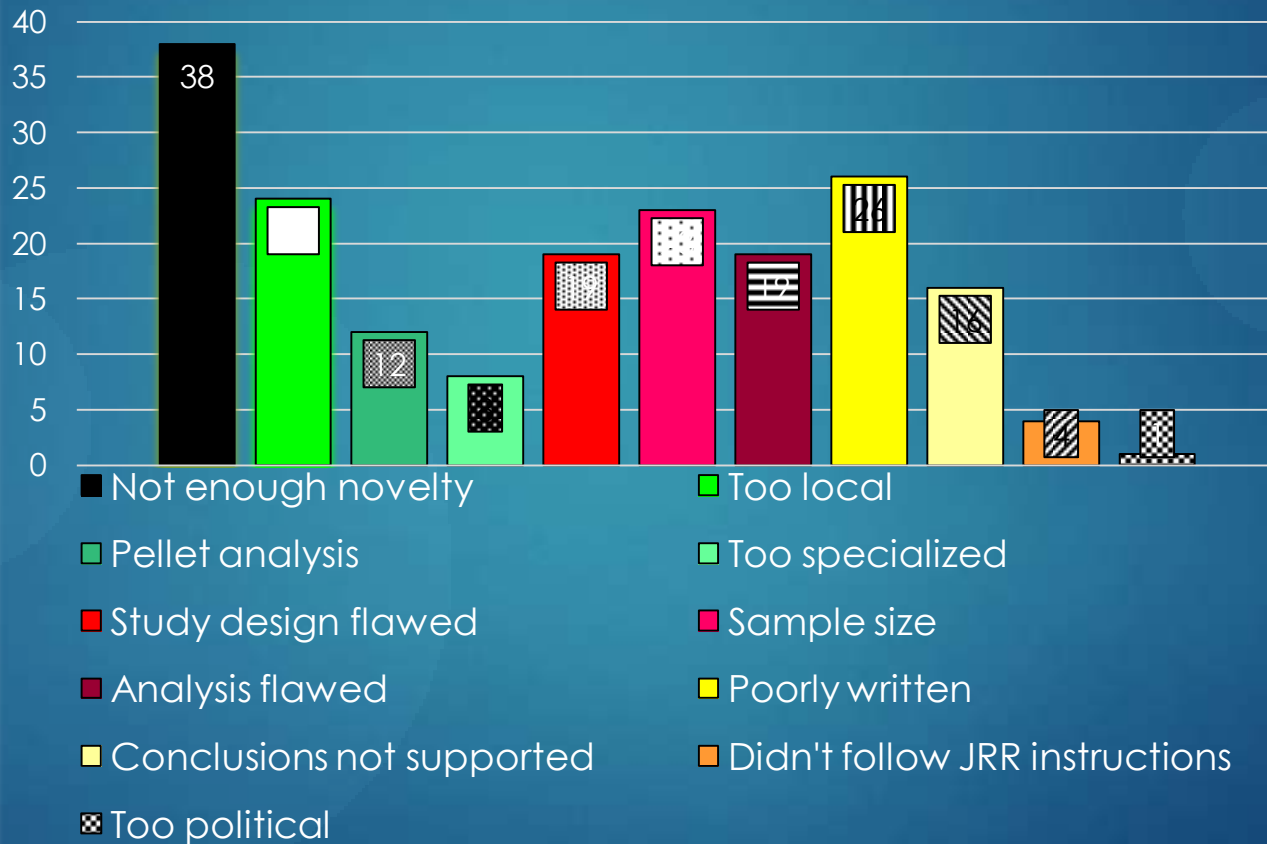




## What type of research is not published in JRR?

### Reasons for rejection at JRR

Number of manuscripts



43% of rejected papers have problems with content



What type of research is not published in JRR?

Articles that are too specialized

e.g., A study of sperm motility in Red-tailed Hawks

Articles that are too local

- Often “range-expansion” manuscripts are too local

Articles that do not have enough novelty for JRR

- Often diet studies using pellets do not have sufficient novelty, unless they compare two or more species, locations or time periods



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e.g., A study of sperm motility in Red-tailed Hawks

REJECTED

Articles that are too local

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What type of research is not published in JRR?

### Articles that are too specialized

NORMAL PLASMA CHOLINESTERASE ACTIVITY OF NEOTROPICAL  
FALCONIFORMES AND STRIGIFORMES

COMPARISON OF TWO FALCONID MUMMIES FROM THE LATE PERIOD OF ANCIENT EGYPT USING  
NONINVASIVE TECHNIQUES

### Articles that are too local

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What type of research is not published in JRR?

### Articles that are too specialized

NORMAL PLASMA CHOLINESTERASE ACTIVITY OF NEOTROPICAL  
FALCONIFORMES AND STRIGIFORMES

**PUBLISHED!**

COMPARISON OF TWO FALCONID MUMMIES FROM THE LATE PERIOD OF ANCIENT EGYPT USING  
NONINVASIVE TECHNIQUES

**PUBLISHED!**

### Articles that are too local

- Often “range-expansion” manuscripts are too local

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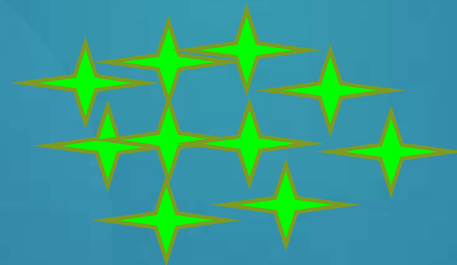
# Successful Publishing

1. Design your study with the end in mind
2. Analyze appropriately
3. Choose the right journal
4. Identify the main finding and write an outline

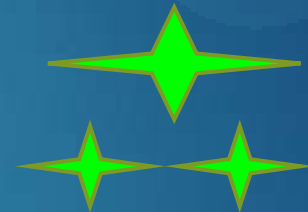
## Choose the new result



1 study



10 results



1 new result  
2 supporting results  
= 1 article

Adapted from: Lichtfouse, E. 2013. Scientific writing for impact factor journals.  
Novinka, New York, USA



Write a traditional outline or a one-page micro-article

MICRO-ARTICLE	
Title	Figure showing the new finding
Global, societal and general problems and issues	
Local, specific and scientific problems	The scientific importance of the result
Hypothesis	Explanation of what is new about the result
Experiments	Local, scientific and specific benefits and implications of the result
Description of the new finding	Global, societal and general benefits and implications

Source: Lichtfouse, E. 2013. Scientific writing for impact factor journals. Novinka, New York, USA

Figure 3. The micro-article. This tool enables the author to identify their results and to focus their article on one main finding.



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Local, specific and scientific problems	The scientific importance of the result
Hypothesis	Explanation of what is new about the result
Experiments	Local, scientific and specific benefits and implications of the result
Description of the new finding	Global, societal and general benefits and implications

Your title should not include

“..with notes on...” or “..and natural history of...”

These words suggest that you are including many minor results and diluting the focus of your paper

Source: Lichtfouse, E. 2013. Scientific writing for impact factor journals. Novinka, New York, USA

Figure 3. The micro-article. This tool enables the author to identify their results and to focus their article on one main finding.

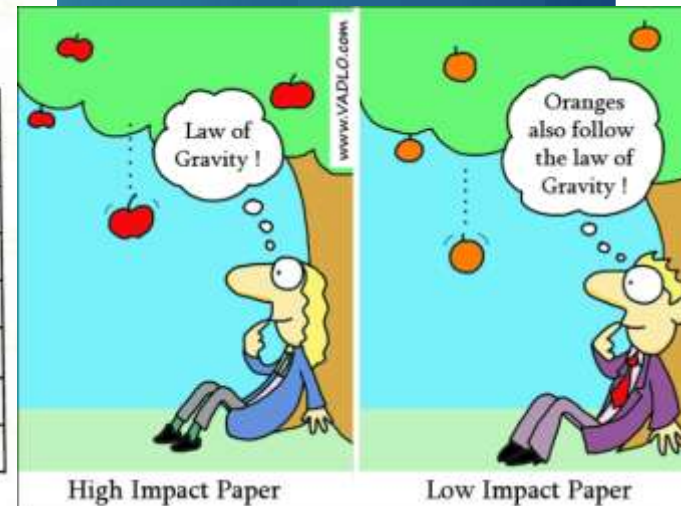


# Successful Publishing

1. Design your study with the end in mind
2. Analyze appropriately
3. Choose the right journal
4. Identify the main finding and write an outline
5. Explain the novelty of your result  
--ideally in the abstract, discussion, and conclusion

**Table V. Examples of forms of novelty**

FORMS OF NOVELTY	
BASIC RESEARCH	APPLIED RESEARCH
A new mechanism	A new invention
A new concept	A new technology
A theoretical advance	An improved technique
A new interpretation	A practical advance
The first observation	New methodology
The first exploration	An improved method



Source: Lichtfouse, E. 2013. Scientific writing for impact factor journals. Novinka, New York, USA



# Successful Publishing

1. Design your study with the end in mind
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4. Identify the main finding and write an outline
5. Explain the novelty of your result

Bednarz (2007) lists two kinds of raptor science:

“Normal science” = replication of studies on classic paradigms or investigation of a local question that has been well-studied elsewhere

“Revolutionary science” = novel ideas that challenge long-held paradigms and stimulate cutting-edge and exciting investigations

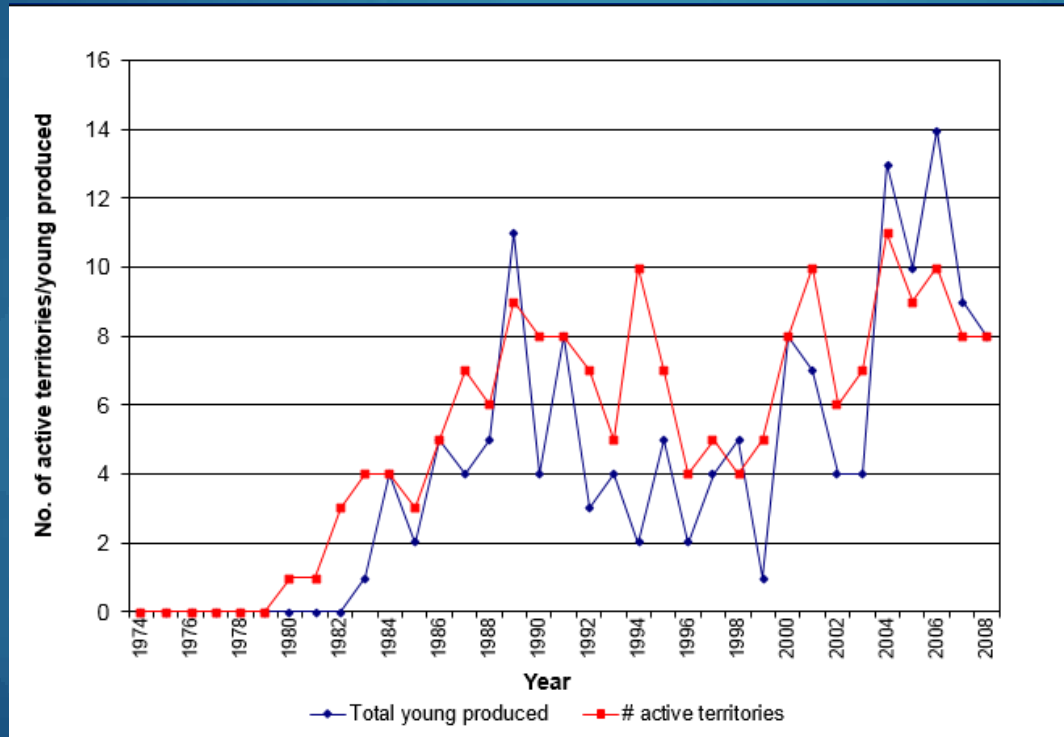
Adapted from: Bednarz, J.A. 2007. Study design, data management, analysis and presentation. Pages 73- 88 in Raptor Research and Management Techniques.



# Successful Publishing

## 6. Prepare simple figures that clearly illustrate results

### Bald Eagle recovery, Apostle Islands, Lake Superior, USA



Source: Dykstra et al. 2010. Mercury, DDE and PCB trends in Bald Eagle nestlings in the Upper Midwest. Talk presented at 2010 RRF meeting, 2010.





# Successful Publishing

## 6. Prepare simple figures that clearly illustrate results

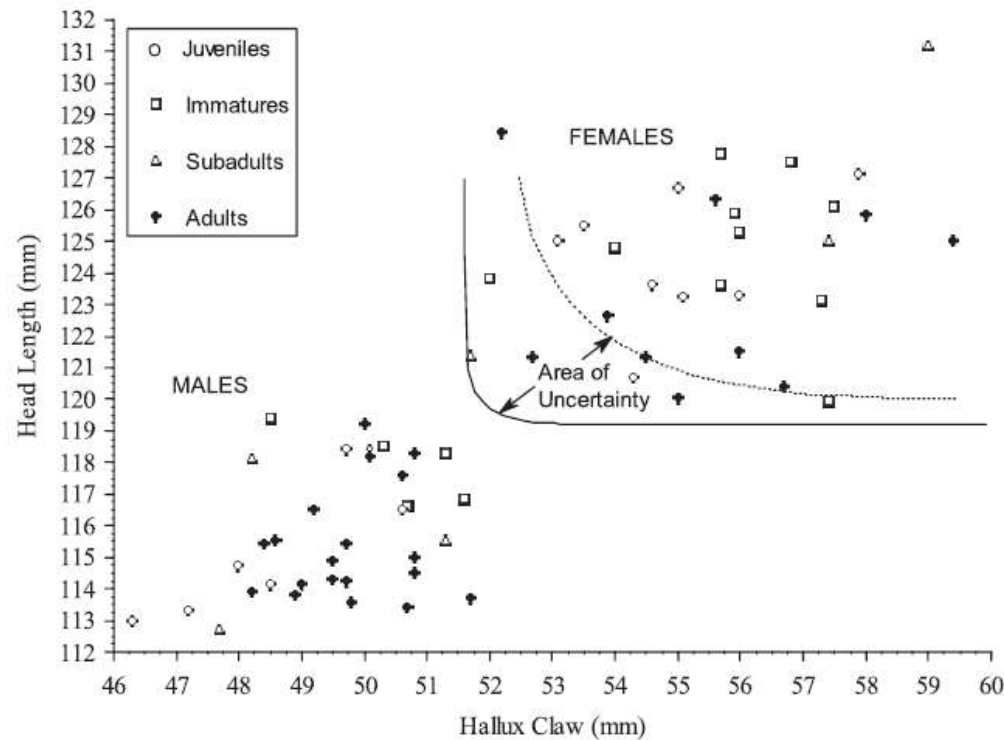


Figure 1. Bivariate Normal Probability Density (BNPD) distributions (curves) and plots of hallux claw and head length of 66 Golden Eagles of confirmed sex captured alive in the western continental United States. Lower left curve (solid line) is 95<sup>th</sup> percentile of all males; upper right curve (dotted line) is 5<sup>th</sup> percentile of all females. All eagles represented above and right of the solid line are females; all below and left of the solid line are males.



Source: Harmata, A. and G. Montopoli. 2013. Morphometric sex determination of North American Golden Eagles. JRR 47:108-116.





# Successful Publishing

## 6. Prepare simple figures that clearly illustrate results

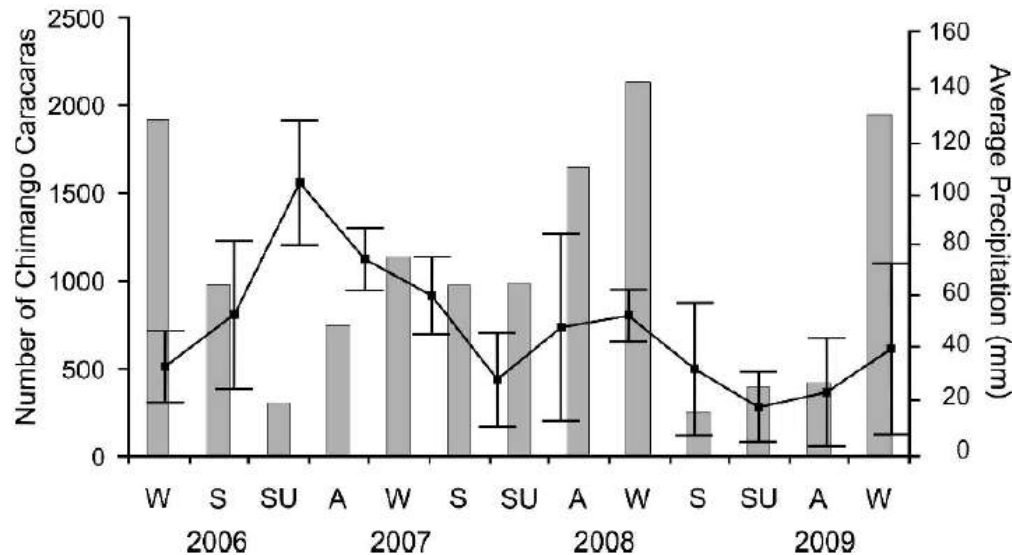


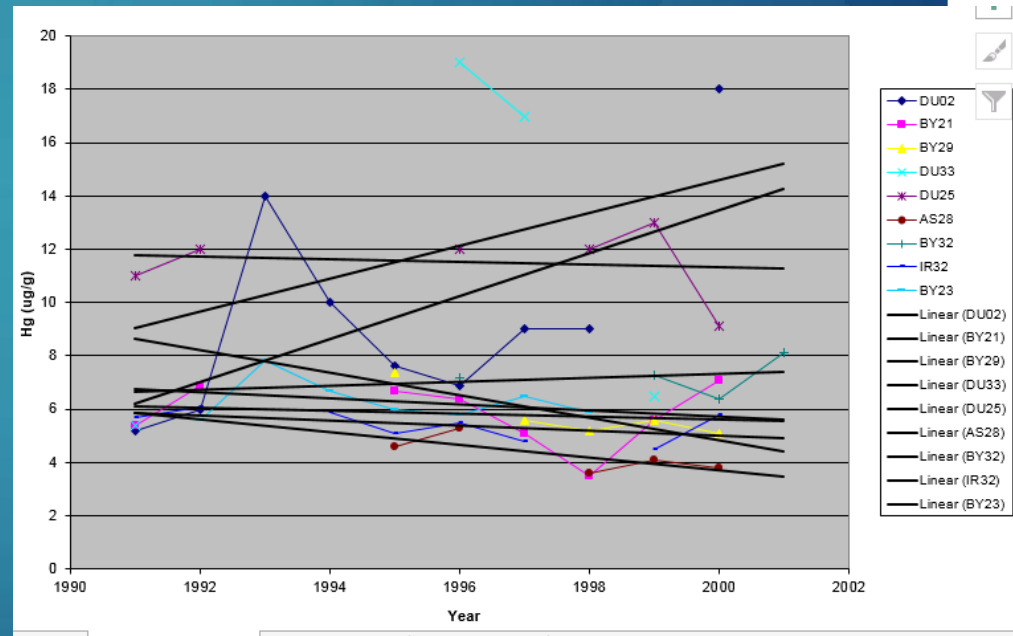
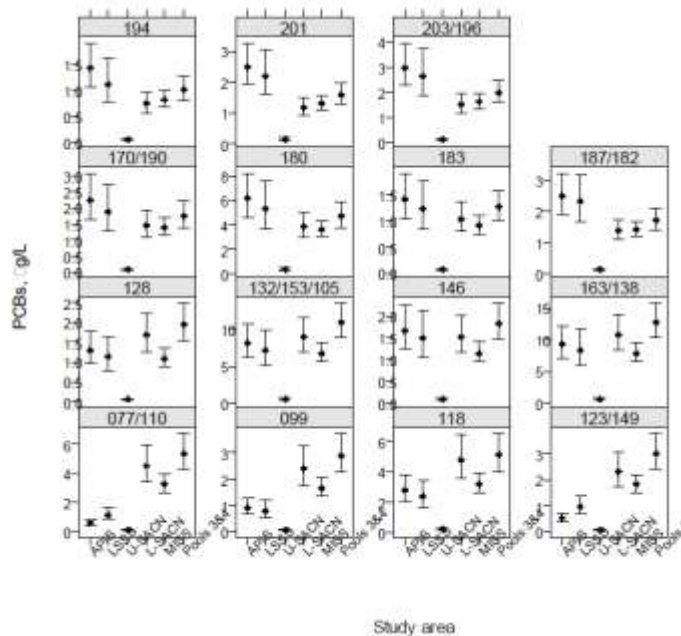
Figure 2. Seasonal variation in the average number of Chimango Caracaras and precipitation from July 2006 through June 2009, in Los Padres Lake Reserve, Buenos Aires province, Argentina. Seasons are: winter (June, July, and August), spring (September, October, and November), summer (December, January, and February) and autumn (March, April, and May). Seasonal Chimango Caracara abundance data are shown as vertical bars, and the points ( $\pm$ SE) show average seasonal precipitation.

Source: Josens, M.L. et al. 2013. Communal roosting of Chimango Caracaras at a shallow lake in the Pampas, Argentina. JRR 47:316--319



## Types of figures to avoid

- Too busy/too many data points
- Font too small
- Too many ideas
- Unclear abbreviations
- Equations and statistics cluttering graph



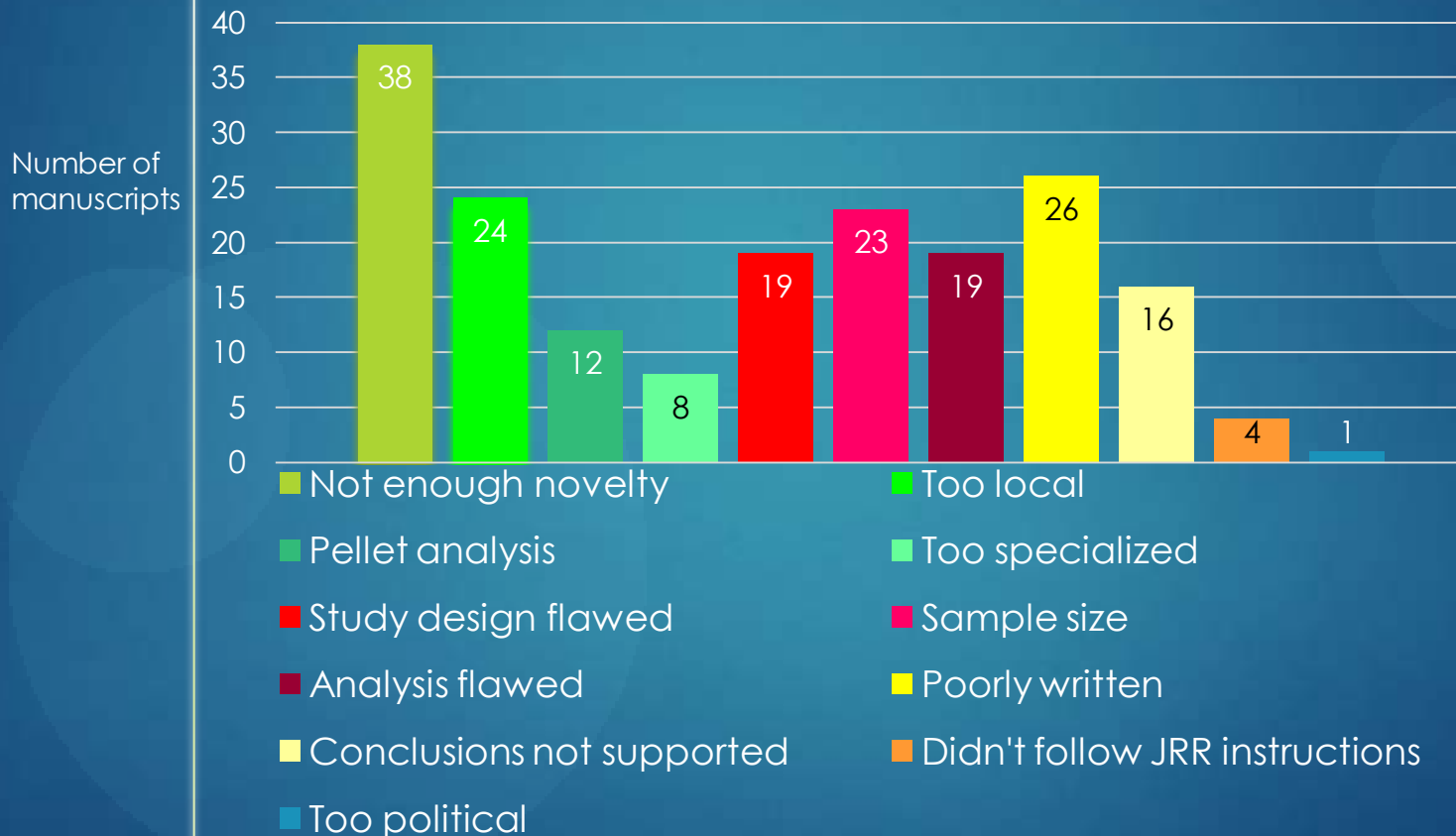
Readers should be able to easily understand your figure without reference to the text of the manuscript



# Successful Publishing

7. Write clearly, avoiding abbreviations, wordiness, and passive voice

Reasons for rejection at JRR



20% of rejected papers have problems with writing



# Successful Publishing

## 7. Write clearly, avoiding abbreviations, wordiness, and passive voice

### APPENDIX. Habitat variables of Red-shouldered Hawk nest sites.

NESTHT	Height of nest tree or plot central tree (m)
NESTDBH	Dbh of nest tree or plot central tree (m)
SLOPE	Slope of plot, measured with clinometer (deg)
ELEV	Elevation of plot, from 7.5' USGS topographical maps (m)
OVERST	Number of overstory trees in plot (stems > 8 cm dbh whose major foliage fell within the upper third of overall stand height)
UNDERST	Number of understory trees in plot (stems > 8 cm dbh whose major foliage fell within the lower two-thirds of overall stand height)
TOTAL	Total number of trees in plot
SNAGS	Number of snags (dead trees) in plot
BASAL	Basal area of all trees in plot ( $\text{m}^2 \text{ha}^{-1}$ )
DBH1	Percentage of trees with dbh 8–12.4 cm
DBH2	Percentage of trees with dbh 12.5–22.6 cm
DBH3	Percentage of trees with dbh 22.7–37.8 cm
DBH4	Percentage of trees with dbh $\geq 37.9$ cm
SHRUB	Number of shrubs < 8 cm dbh and > 50 cm tall within 5 m of plot center
SHRUBHT	Estimated height of dominant shrub species (m)
GRCOVER	Percentage ground cover, measured with ocular tube (James and Shugart 1970) at 1-m intervals between 1 and 10 m from plot center in cardinal directions
UNCOVER	Percentage understory cover, measured in same manner as GRCOVER
CANHT	Canopy height of plot, measured in each quadrant and averaged (m)
CANNEST	Percentage canopy closure at the nest, measured with a convex densiometer in each cardinal direction, and averaged
CANPLOT	Percentage canopy closure in the plot, measured with a convex densiometer in the four cardinal directions at the nest and in the four cardinal directions at four points 8.5 m from plot center, and averaged
WATER	Distance to nearest permanent or seasonal water (m)



### DISCUSSION

Red-shouldered Hawks at both SW Ohio and Hocking Hills selected nest sites in areas of relatively mature forest that were near a water source. Several of the inter-related variables that differed between nest sites and paired random plots were related to the size of the nest tree and the surrounding forest (i.e., NESTHT, NESTDBH, CANHT, and BASAL). Nest sites also were closer to water than paired random plots at SW and probably at HH. Distance to available water sources may have influenced the significance of the variable ELEV. ELEV, which was significant in univariate tests at SW, was significant, but weakly, correlated to WATER ( $r = 0.26$ ,  $P = 0.003$ ). Most of the water sources nearest to nests at SW were small streams running through

Source: Dykstra et al. 2000. Nest site selection and productivity of suburban Red-shouldered Hawks in southern Ohio. Condor 102:401-408



# Successful Publishing

7. Write clearly, avoiding abbreviations, wordiness, and passive voice

**Unclear pronoun antecedent:** Barred Owls have been studied by ornithologists for several years. They typically initiate breeding behavior in March.

**Better:** Studies by ornithologists have revealed that Barred Owls typically initiate breeding behavior in March.

**Even better:** Barred Owls typically initiate breeding behavior in March.

Sources: <http://fishwild.vt.edu/ornithology/Ornithology/ScientificLiteratureandWriting2.htm>  
and Journal of Raptor Research files



# Successful Publishing

7. Write clearly, avoiding abbreviations, wordiness, and passive voice

**Sentence too long:** At 0900 PDT and approximately 1 km south of the location where we first observed the resident Bald Eagle pair perched together, both adult eagles (both unmarked, but likely the same resident mated eagle pair at the lake just observed) were observed flying rapidly <20 m above the lake surface towards an in-flight Osprey ca 100 m away and ca 30 m above the lake surface with a fish in its talons flying near the only active Osprey nest on the Warm Springs Creek arm of the lake, in a dead ca 30 m Douglas fir (*Pseudotsuga menziesii*).

Sources: <http://fishwild.vt.edu/ornithology/Ornithology/ScientificLiteratureandWriting2.htm> and Journal of Raptor Research files



# Successful Publishing

7. Write clearly, avoiding abbreviations, wordiness, and passive voice

Wordy	Concise
Due to the fact that	Because
With regard to	About
Has the ability to	Can
It is possible that	May or might
It is important that	Must or should

Source: <http://writingcenter.unc.edu/handouts/style/>





# Successful Publishing

7. Write clearly, avoiding abbreviations, wordiness, and passive voice

Define your terms and be consistent

Ex: reproductive terminology

Nest with signs of reproductive activity	Nest with eggs	Nest producing 1 or more fledglings
Occupied nest	Active nest	Successful nest
Nesting attempt	Breeding attempt	
Territorial pair	Laying pair	

See: Steenhof, K. 1987. Assessing raptor reproductive success and productivity, Pages 157-17-in Raptor Management Techniques Manual.

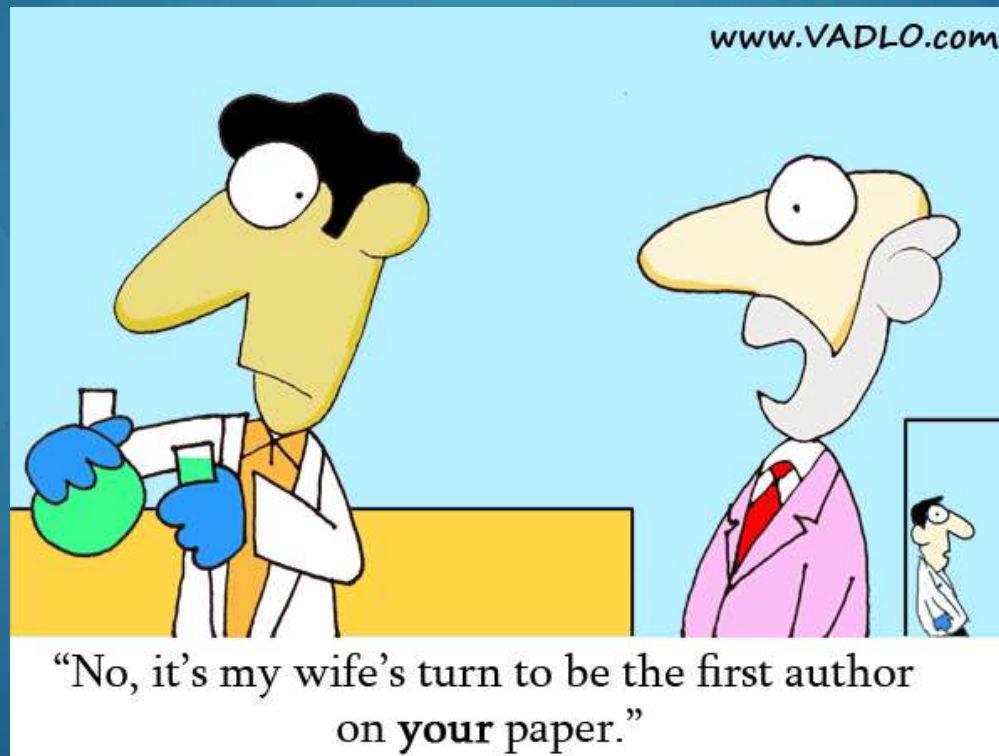
Steenhof, K. and I. Newton. 2007. Assessing nest success and productivity. Pages 181-192 in Raptor Research and Management Techniques



# Successful Publishing

## 8. Assign authorship appropriately

Who should be an author?





# Successful Publishing

## 8. Assign authorship appropriately

Who should be an author?

An author should participate in at least 2 of the 5 key areas of research:

- 1) Conception: study idea, proposals, funding
- 2) Design: development of study design and logistics
- 3) Execution and data collection: data collection and administration
- 4) Data analysis: data entry, data verification, analysis
- 5) Writing the manuscript

Adapted from: Bednarz, J.A. 2007. Study design, data management, analysis and presentation. Pages 73- 88 in Raptor Research and Management Techniques.



# Successful Publishing

## 9. Follow the journal's formatting instructions exactly

Slack presentation = slack science!

Editors and reviewers “believe that if an author is unable to apply some simple formatting instructions, then their science is probably equally slack”  
(Lichtfouse 2013)

Most errors in: references, section headings, title page



# Successful Publishing

## 9. Follow the journal's formatting instructions exactly

Slack presentation = slack science!

What are the reasons authors format incorrectly?

- Author thinks formatting can be done after acceptance
- Paper has been rejected by another journal and author did not change the formatting. (This also suggests that author did not make any revisions requested by the first journal.)

These strategies waste time and encourage rejection



# Successful Publishing

6. Prepare simple figures that clearly illustrate results
7. Write clearly, avoiding abbreviations, wordiness, and passive voice
8. Assign authorship appropriately
9. Follow the journal's formatting instructions exactly
10. Understand the publishing process



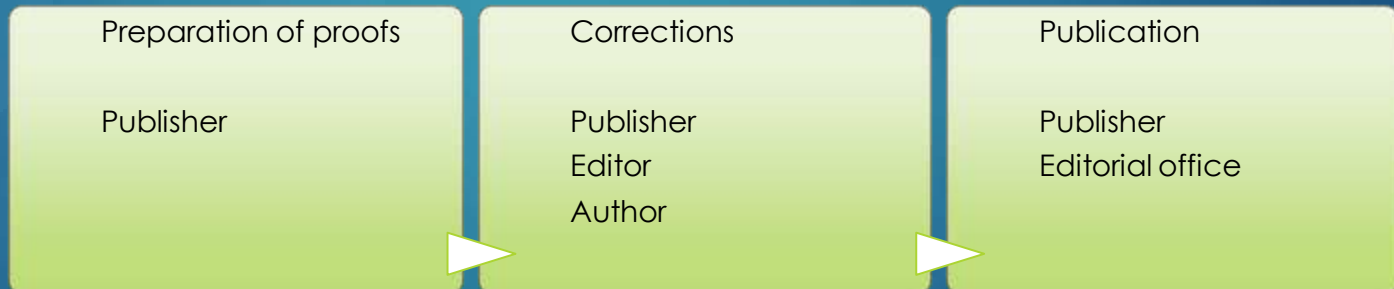
# Successful Publishing

## 10. Understand the publishing process

### 1. Scientific assessment



### 2. Production and Publication



Adapted from: Lichtfouse, E. 2013. Scientific writing for impact factor journals. Novinka, New York, USA





# Successful Publishing

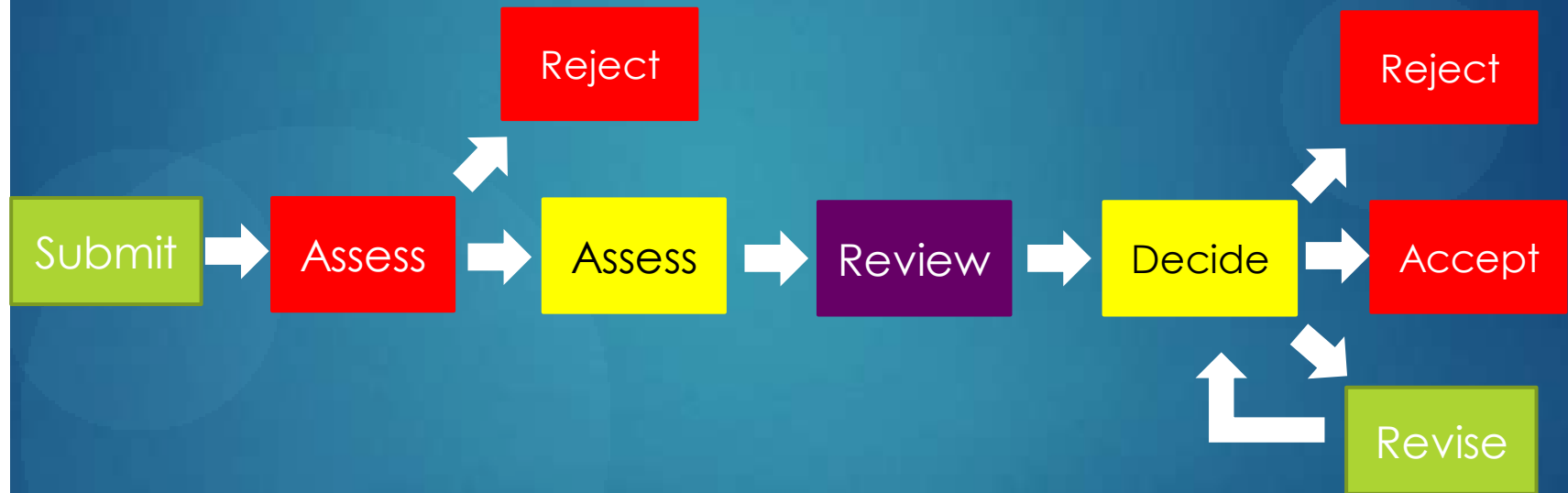
## Journal of Raptor Research Process

Author

Editor

Associate Editor

Peer-reviewers





# Successful Publishing

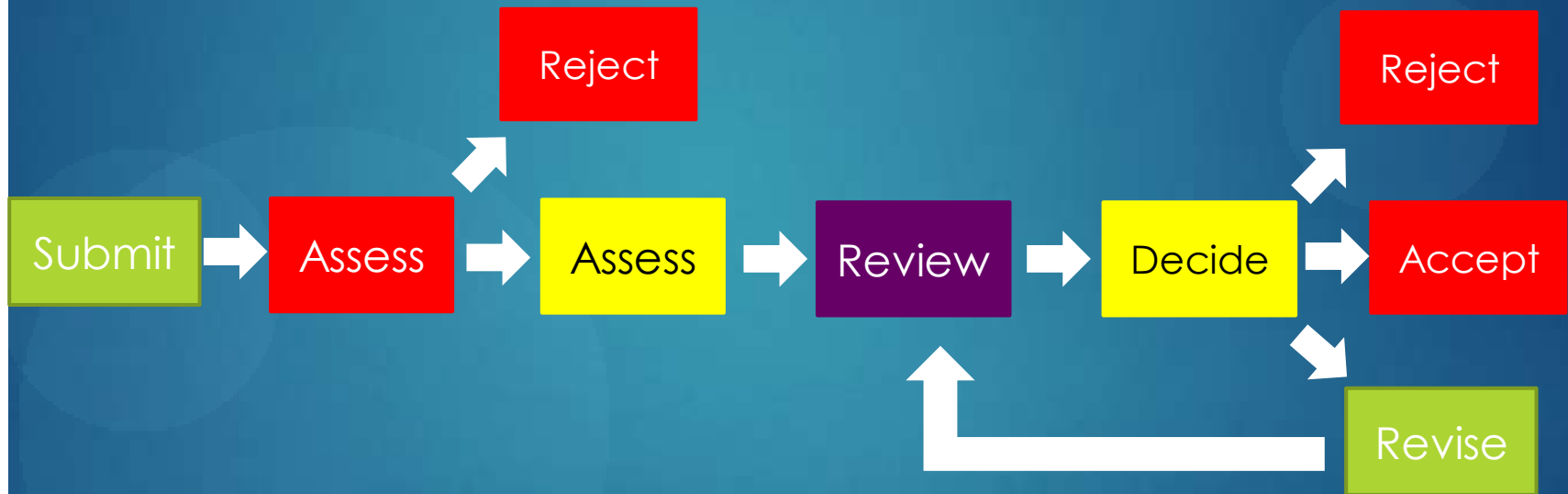
## 10. Understand the publishing process

Author

Editor

Associate Editor

Peer-reviewers

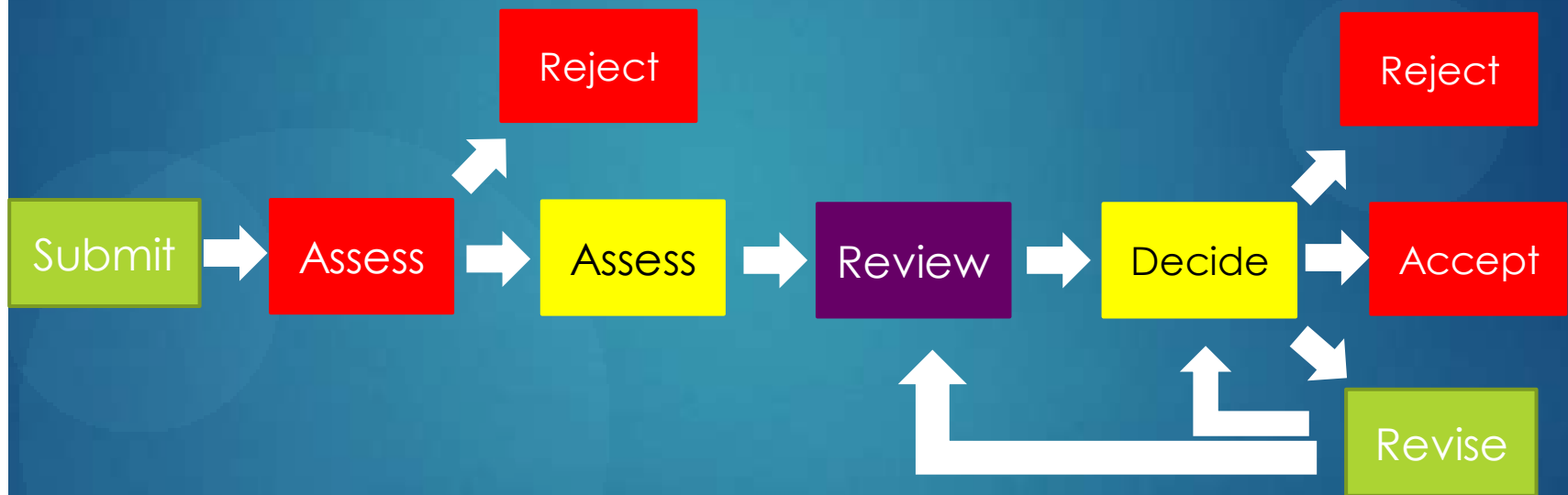




# Successful Publishing

## 10. Understand the publishing process

Author   Editor   Associate Editor   Peer-reviewers





# Successful Publishing

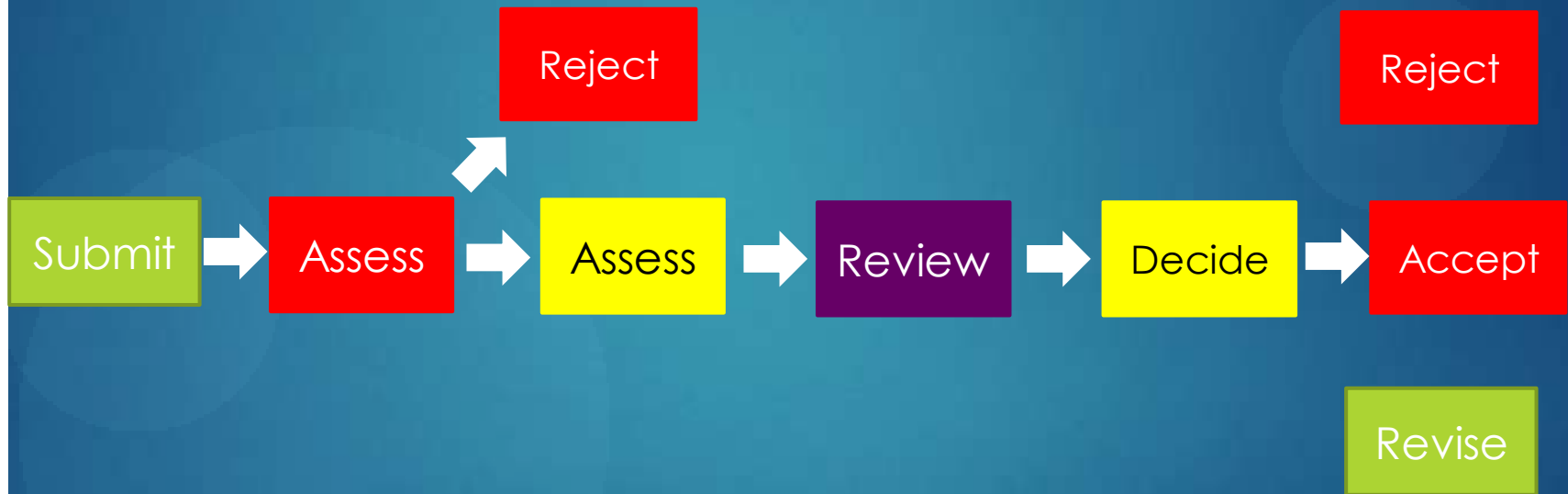
## 10. Understand the publishing process

Author

Editor

Associate Editor

Peer-reviewers





# Successful Publishing

## 10. Understand the publishing process

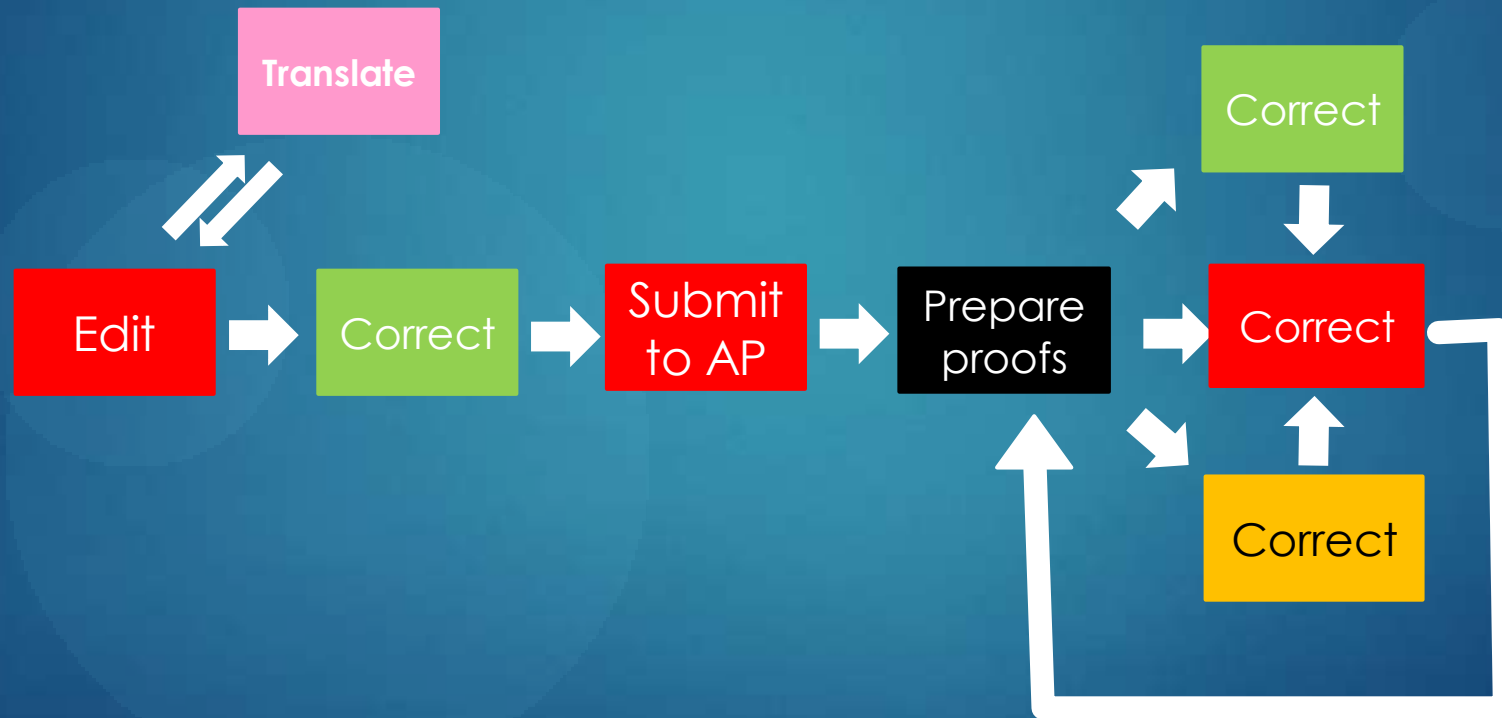
Author

Editor

Publisher

Spanish Translator

Proofreader





# Successful Publishing

## 10. Understand the publishing process

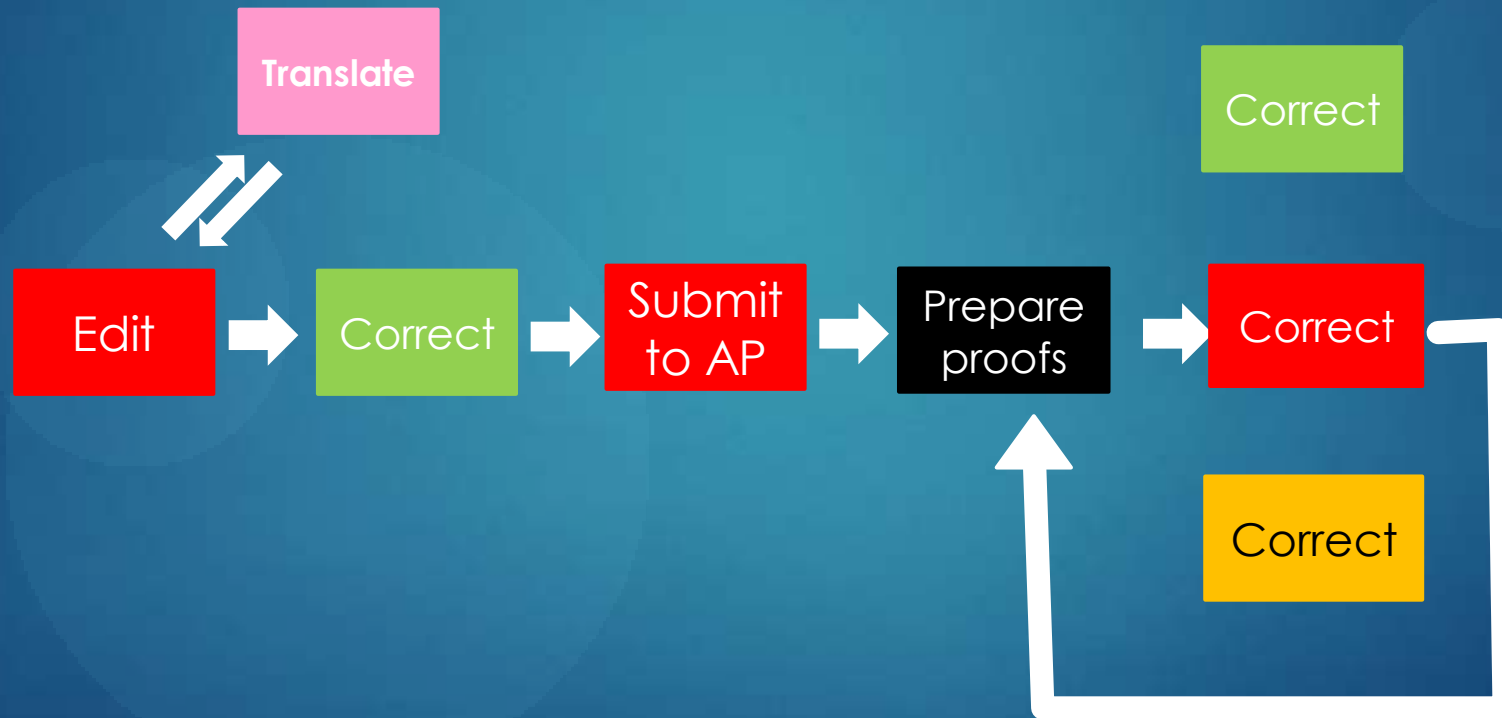
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Editor

Publisher

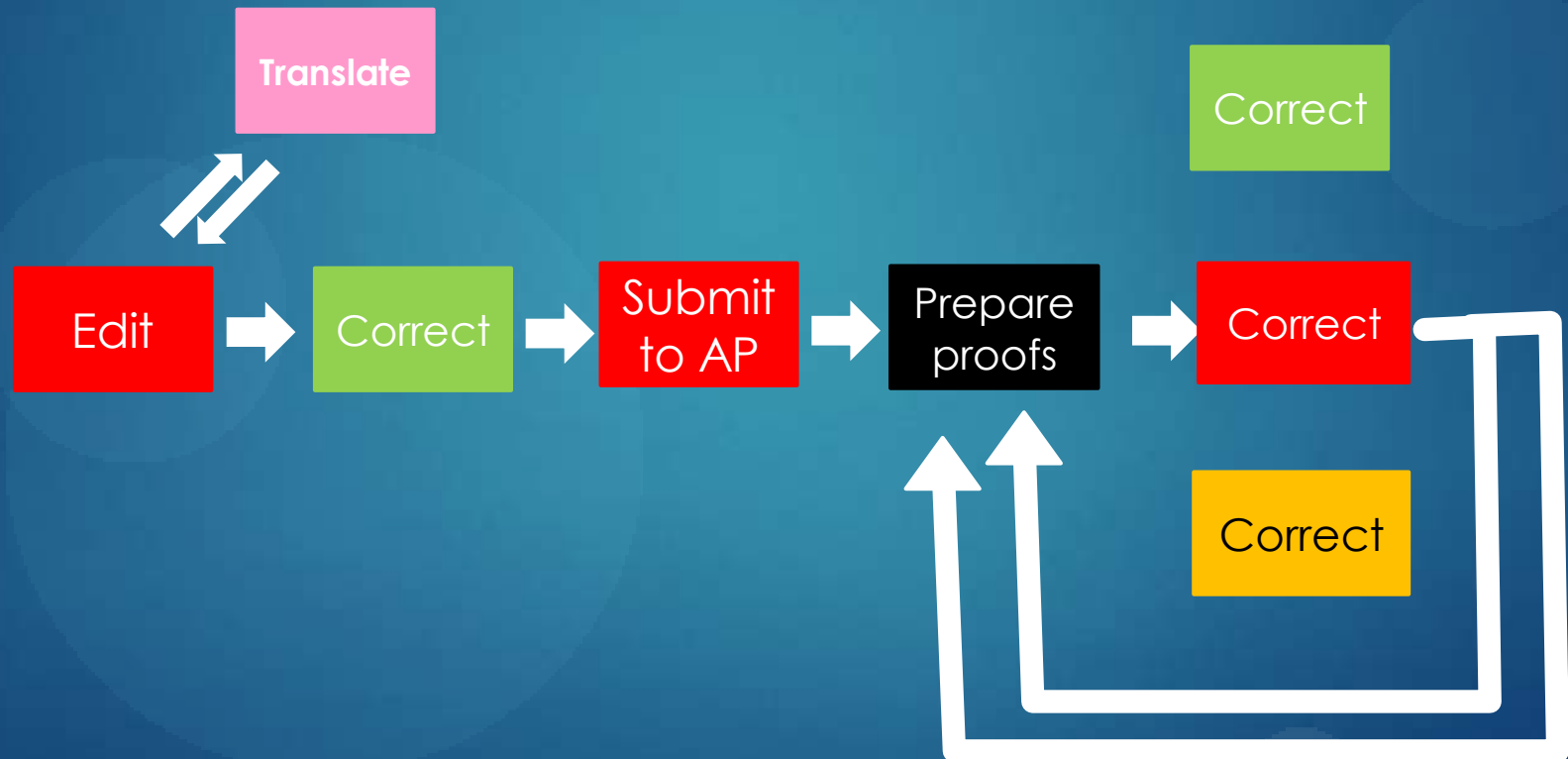
Spanish Translator

Proofreader



## 10. Understand the publishing process

# Proofreader







# Successful Publishing

## 10. Understand the publishing process

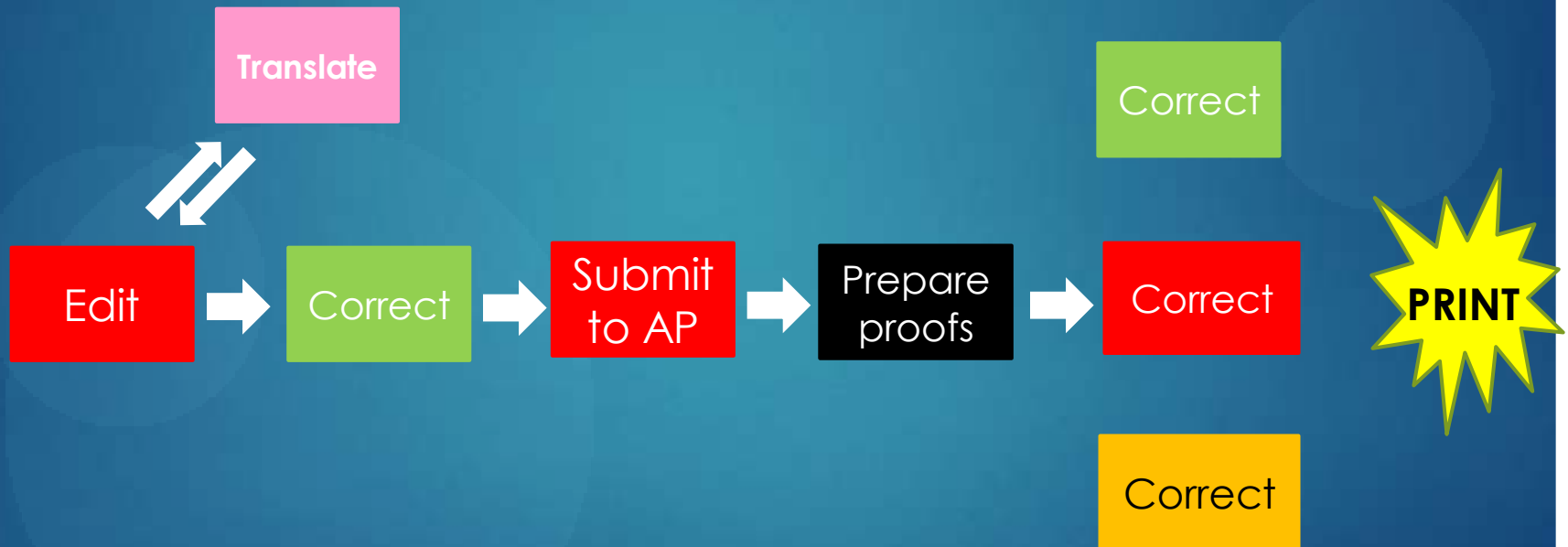
Author

Editor

Publisher

Spanish Translator

Proofreader

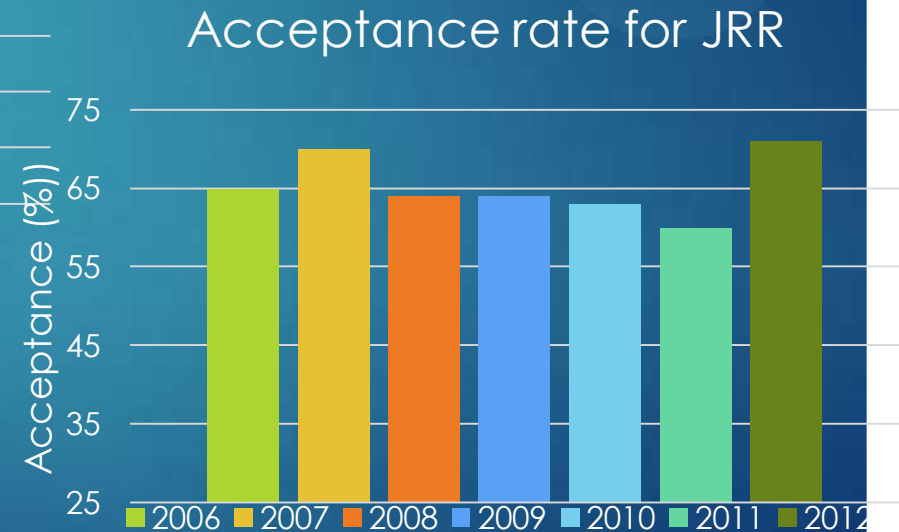
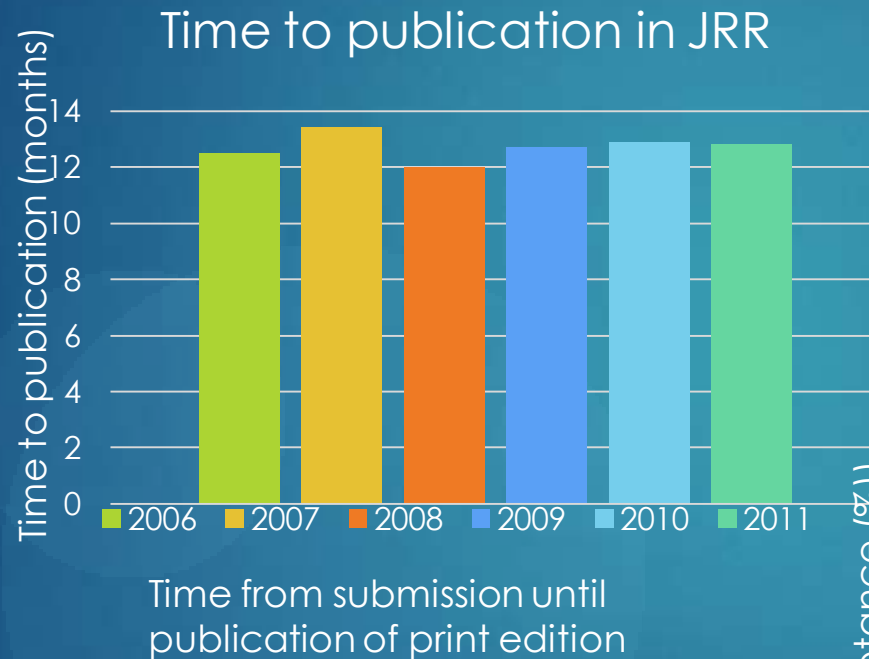


Note that this illustration includes only steps related to the preparation of the articles, and does not include the billing of page charges, in which the RRF Treasurer plays a major role.



# Successful Publishing

## 10. Understand the publishing process





## Why choose Journal of Raptor Research?

- It is the preeminent journal dedicated to raptors in the world
- Your work will be seen by raptor biologists worldwide
- We understand the challenges of studying raptors
- JRR wants to help you publish your study
- You will be helping RRF

Welcome to the  
**Raptor Research  
Foundation**

The Raptor Research Foundation (RRF) is an international scientific society whose primary goal is the accumulation and dissemination of scientific information about raptors.

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A close-up of a bird of prey, possibly a falcon, in flight against a clear blue sky. The bird's wings are spread, showing detailed feather patterns.

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# Successful Publishing

1. Design your study with the end in mind
2. Analyze appropriately
3. Choose the right journal
4. Identify the main finding and write an outline
5. Explain the novelty of your result
6. Prepare simple figures that clearly illustrate results
7. Write clearly, avoiding abbreviations, wordiness, and passive voice
8. Assign authorship appropriately
9. Follow the journal's formatting instructions exactly
10. Understand the publishing process



# Celebrate!



**And then get back outside!**



# Acknowledgments

Thanks to James Dwyer for providing data on JRR publications, and to Sara Miller, Jeff Hays, and Bob Dykstra for photographs.

Further reading:

Lichtfouse, E. 2013. Scientific writing for impact factor journals. Novinka, New York, USA

Bednarz, J.A. 2007. Study design, data management, analysis and presentation. Pages 73- 88 in Raptor Research and Management Techniques.

Cargill, M. and P. O'Connor. 2013. Writing scientific research articles, Second Ed. Wiley-Blackwell.



