

# From Thesis to Publication

IESS - University of Ghana

*Heiko L Schoenfuss, PhD*  
*U.S. Fulbright Scholar*

# ***DISCLAIMER***

***Always confer with your advisors before starting a scientific communication project – there may be specific constraints that supersede comments in this lecture!***

**YOU are responsible to communicate effectively.**

- 1. WHY are you writing ?***
- 2. WHO is your intended target audience?***
- 3. WHAT is the story you are hoping to tell?***

# 1. Is the thesis publishable?

- Advisor and co-author approval
- Subject
- Novelty
- Relevance
- Scientific rigor

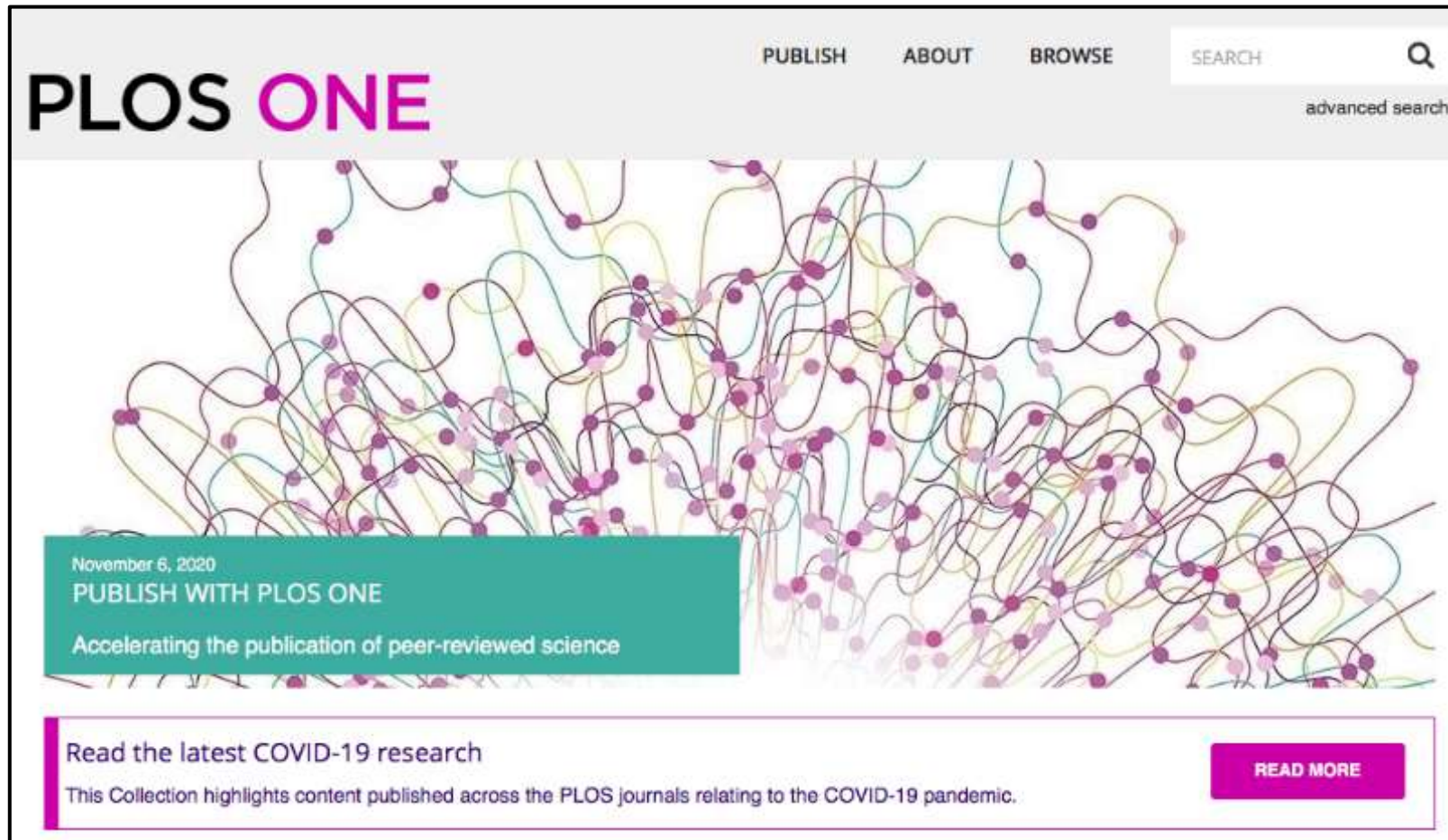
## 2. What journal is appropriate?

- Journal scope (*Guide for Authors*)
- Society journal



## 2. What journal is appropriate?

- Open access journal



## 2. What journal is appropriate?

- Cost of open access?
  - PLOS One: \$1,250
  - Frontiers in Ecol & Evol: \$2,490
  - Copeia: ?
  - Microbiology: \$1,950



## 2. What journal is appropriate?

- Impact Factor?
  - PLOS One: 2.74
  - Frontiers in Ecol & Evol: 2.46
  - Copeia: 1.12
  - Microbiology: 1.866
  - Nature: 42.7
  - ***BE AWARE OF PREDATORY JOURNALS !***



# Spot Predatory Journals:

- They contact you.
- They have very broad names:
  - *“International Journal of Business, Humanities and Technology”*
- They promise very quick turn around.
- They ask for a submission within the next few days/weeks.
- The email is very informal/unprofessional and often contain spelling errors:
  - *“Hi, I am Alex. We are short a submission for our prestigis flagship jornal XYZ – would you be so kindly and send us a submision right away”*
- The journal website is very basic – especially beyond the home page.
- The number of published articles is <10 (Vol 2, Issue 1)

# Spot Predatory Journals:

Junk Email ☆



Yesterday

V

Veterinary Science - Animal Husban...  
Hi Heiko L. Schoenfuss... Sun 9:24 PM  
CAUTION: This e-mail originated fro...

V

Veterinary Science - Animal Husban...  
Hi Heiko L. Schoenfuss... Sun 9:24 PM  
CAUTION: This e-mail originated fro...

PP

Pharmacy and Pharmacology  
Pharmacy - Welcomin... Sun 8:52 PM  
CAUTION: This e-mail originated fro...

Hi Heiko L. Schoenfuss, Special issue invitation: Streamlined submission



Dear Heiko L. Schoenfuss

Good day. Hope this mail finds you well in these tough times.

**Journal of Veterinary Science and Animal Husbandry [2348-9790]** is an open access highly-cited journal dedicated to disseminating research findings in the broad domains of **Veterinary Science** and **Animal Husbandry**.

You are invited to contribute original research articles, reviews, brief reports, short communications, or case studies for this next issue **Volume 11 Issue 2** that will help us expand our understanding of Veterinary Science and Animal Husbandry. The manuscript's length is unrestricted. The double-blind peer-review method will be used on all manuscripts.

For more details and to submit your article please follow the link: [Journal Website](#)

We look forward to hearing from you about your manuscript, any valuable comments or suggestions, and any recommendations for other authors.

Your contribution will assist us in improving the journal's quality and content. Please do not hesitate to contact us with any questions.

We eagerly anticipate your positive response.

Warm Regards

**John Richards** | Editorial Assistant  
Journal of Veterinary Science and Animal Husbandry

.....  
#9587 Nittany, Dr Apt 103  
Manassas, Virginia 20110, USA

# *Spot Predatory Journals:*

Check web resources:

- Is the journal indexed: PubMedCentral ?
- Is the journal listed in the Directory of Open Access Journals (DOAJ) ?

→ check with your advisor if you are in doubt!!!

## 2. What journal is appropriate?

- Journal scope (*Guide for Authors*)
- Society journal
- Open access journal

→ journals you cite are journals where you want to publish.

### 3. Preparing for journal submission.

- Review *Guide for Authors*
- Organize all (and only) manuscript data
- Generate final figures & tables
- Write manuscript (do NOT cut-and-paste)
- Prepare ancillary documents
- REVISE, REVISE, REVISE
- Ensure ALL co-authors agree

### 3. Preparing for journal submission.

#### Introduction

- Economy is key – journal articles are short and pointed.
- Know your readers!
- Use the “funnel”: broad concept to narrowed focus.
- Support statements with references
- Active voice (“we conducted a study)  
vs. passive voice (“a study was conducted”)?

### 3. Preparing for journal submission.

#### Methods

- As much as possible, reference published methods.
- You need to be brief but comprehensive.
- Unusual, unique methods need to be described in detail.
- Include a section on Quality Assurance/Quality Control.
- All data presented in the Results need to have their Methods introduced.



### 3. Preparing for journal submission.

#### Methods

- Klimisch et al., 1997. *A Systematic Approach for Evaluating the Quality of Experimental Toxicology and Ecotoxicology Data*. Reg. Toxicol. Pharmacol. 25:1-5.
- Harris et al., 2014. *Principles of Sound Excotoxicology*. Environ. Sci. Technol. 48:3100-3111.
- Kuster et al., 2009. *Regulatory Demands on Data Quality for the Environmental Risk Assessment of Pharmaceuticals*. Reg. Toxicol. Pharmacol. 55:276-280.

### 3. Preparing for journal submission.

#### Methods – What is Missing:

- Sample methodology include sample size & frequency
- Animal species, sex, age, reproductive condition
- Replicates
- Controls (positive/negative)
- Purity of compounds used (and their source)
- Definition of effects
- Data treatment and statistics

### 3. Preparing for journal submission.

#### Tables and Figures

- Be aware of the guidelines for Tables and Figures.
- Journals do not want 10 one-pane Figures or massive data Tables (→ supplemental information).
- Space is limited only key Figures and Tables should go into the main manuscript (no more than 6-7 total)
- Accessibility is important – think of color-blind readers!

### 3. Preparing for journal submission.

#### Tables

- Legend goes on top and needs to be comprehensive.
- No shading of rows/columns
- Only horizontal lines
- Formatting is very specific – read guidelines before you start making your tables.

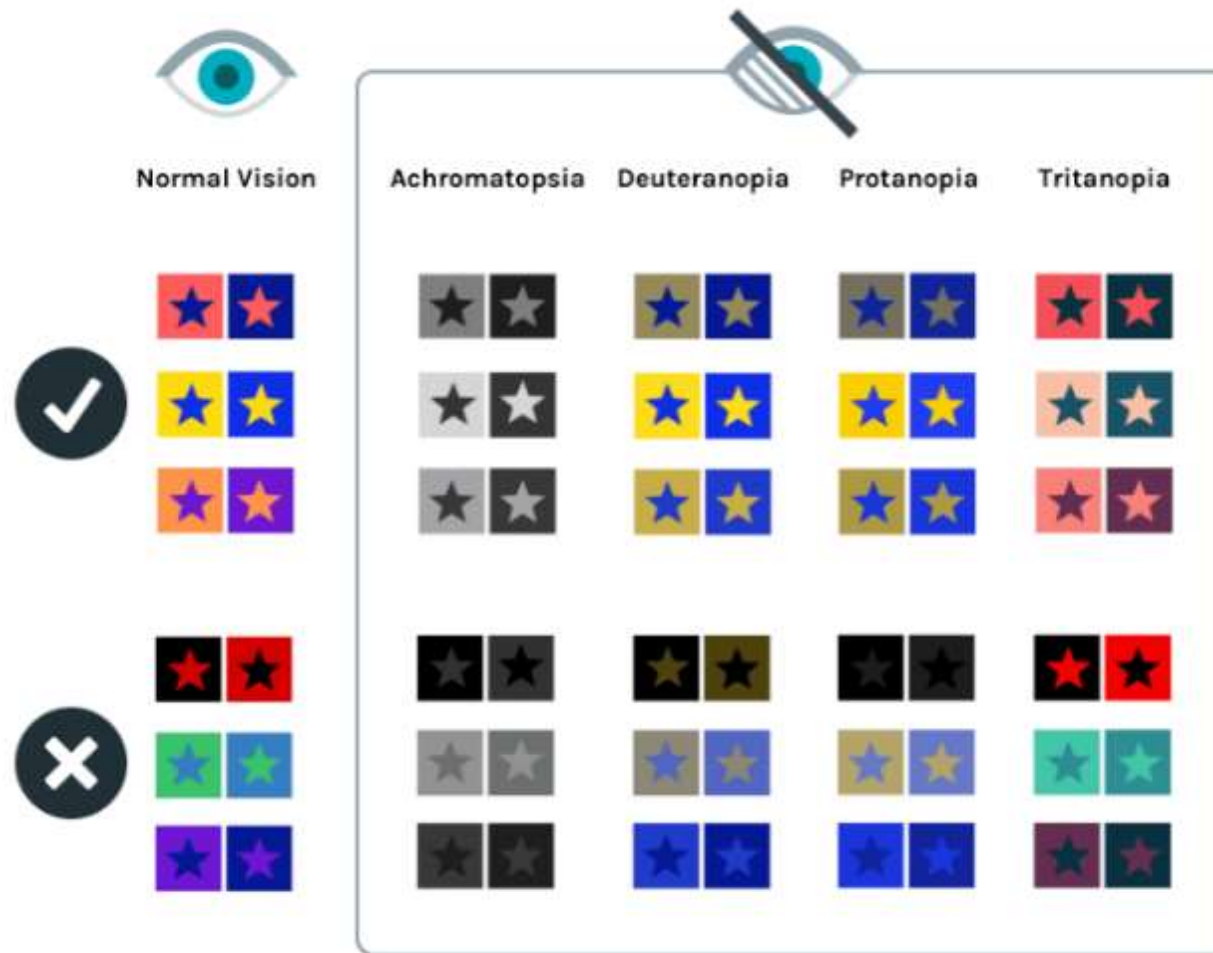
### 3. Preparing for journal submission.

#### Figures

- Legend on the bottom and needs to be comprehensive.
- Formatting is very specific – read guidelines first!
- High resolution and file type (png or tiff) are critical.
- **You CANNOT use a previously published figure !!!**
- Consider color accessibility:

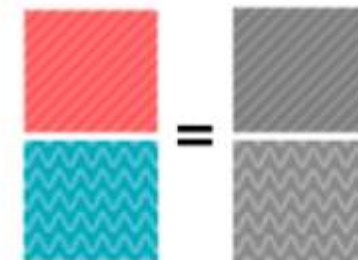
<https://venngage.com/blog/accessible-colors/>

# Color Accessibility.



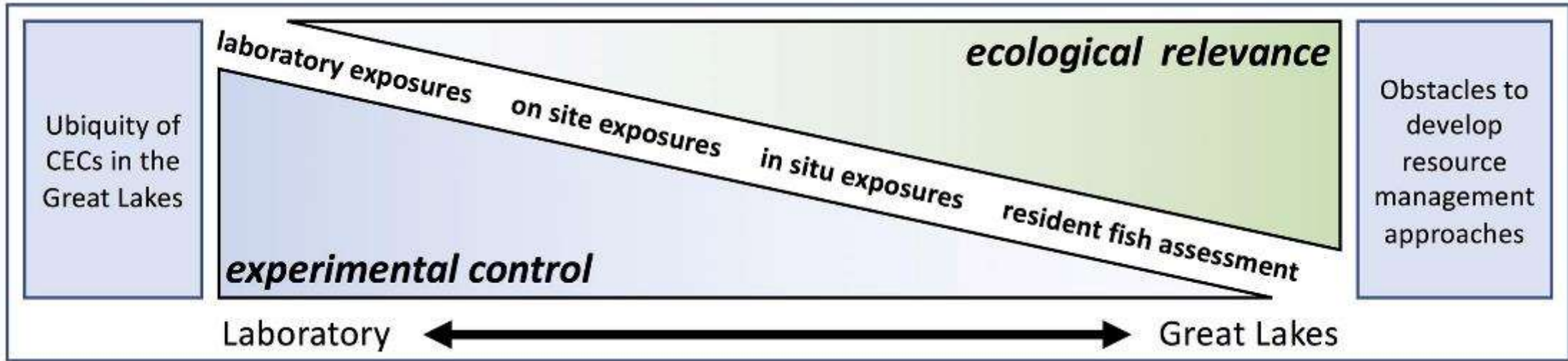
## Can I still use low color contrast pairings in my design?

These pairings can present an accessibility issue when layered, but feel free to use them in your designs otherwise! To help distinguish low color contrast combos, consider including icons and/or patterns.

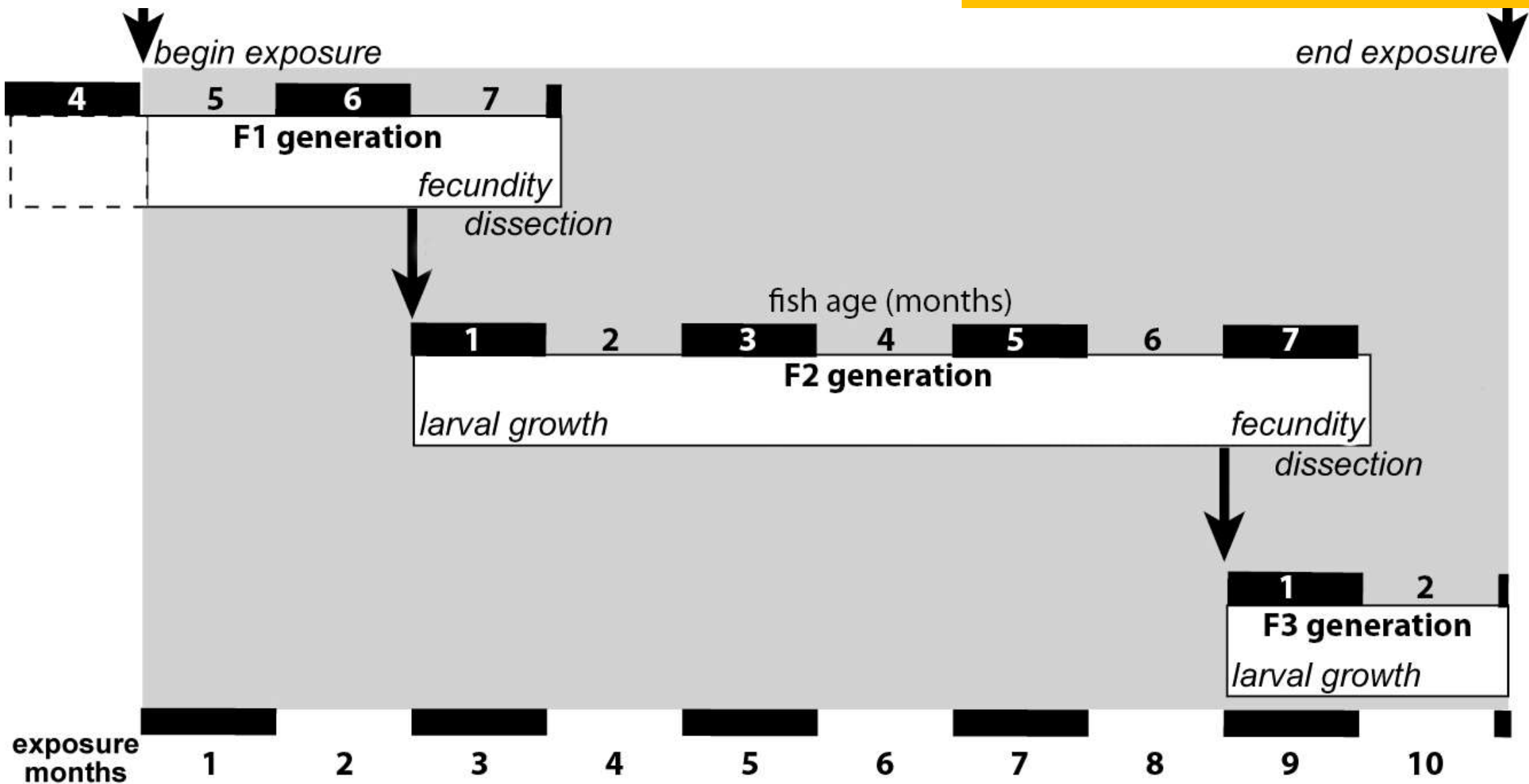


### 3. Preparing for journal submission.

If your experimental design or hypothesis is complex, consider a schematic figure:



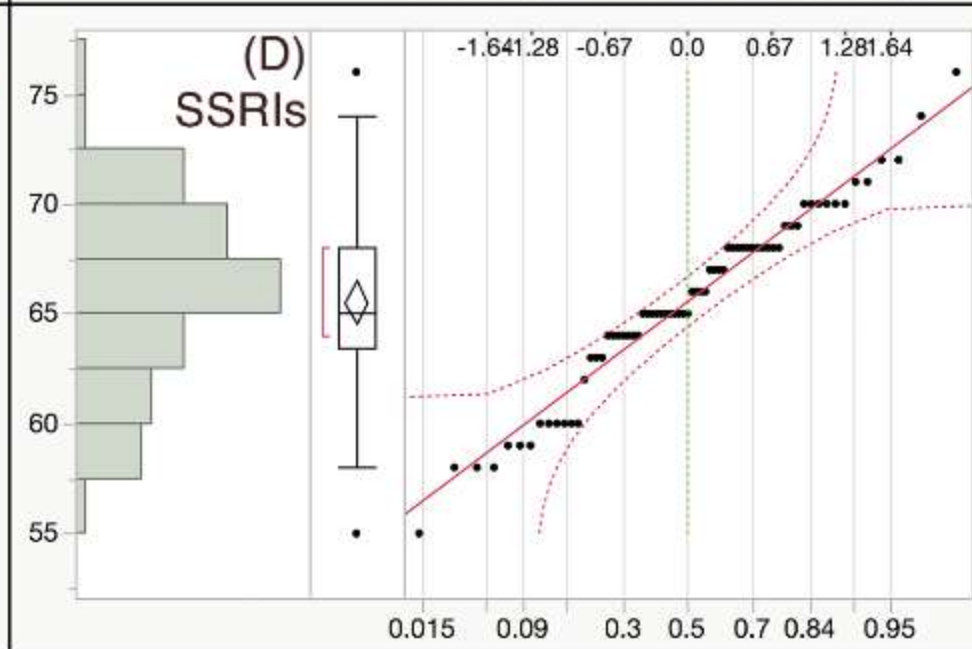
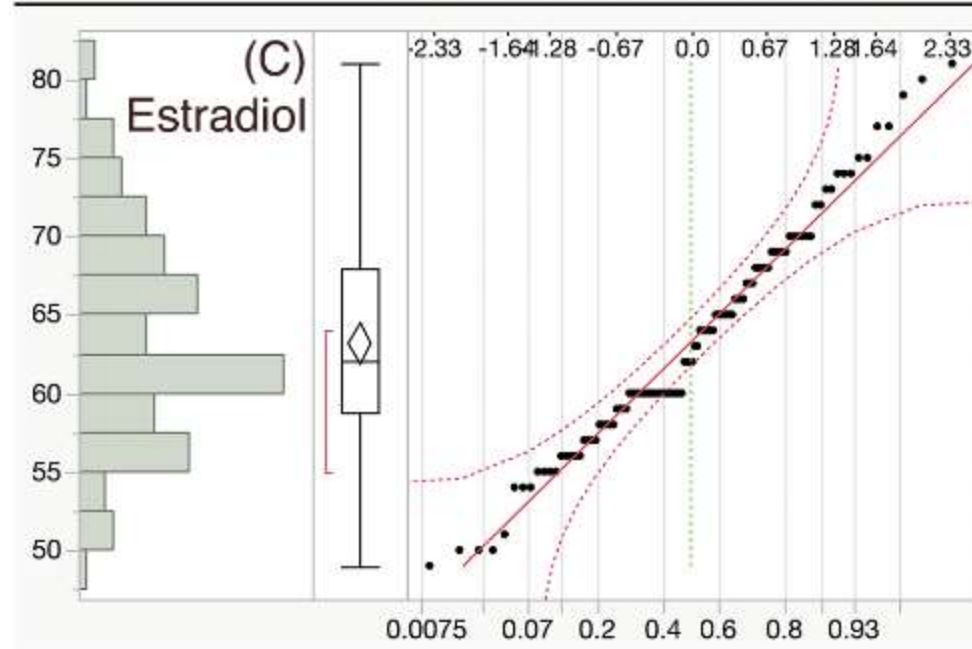
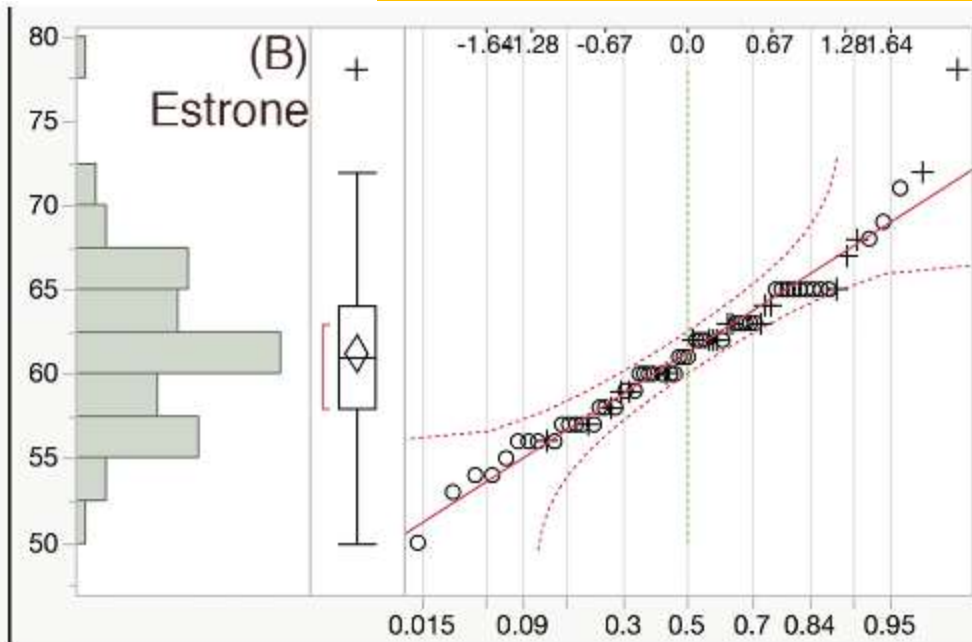
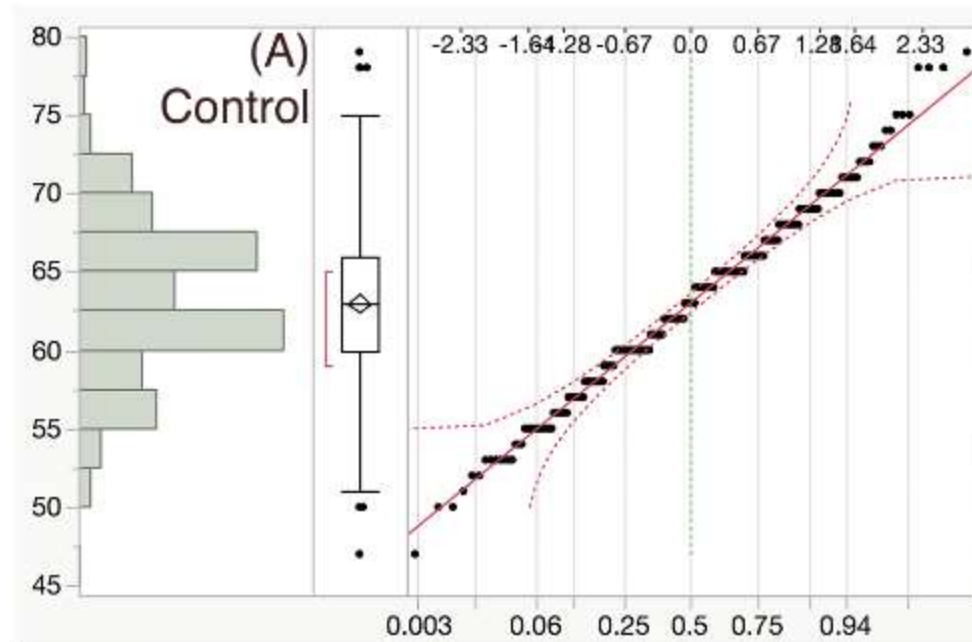




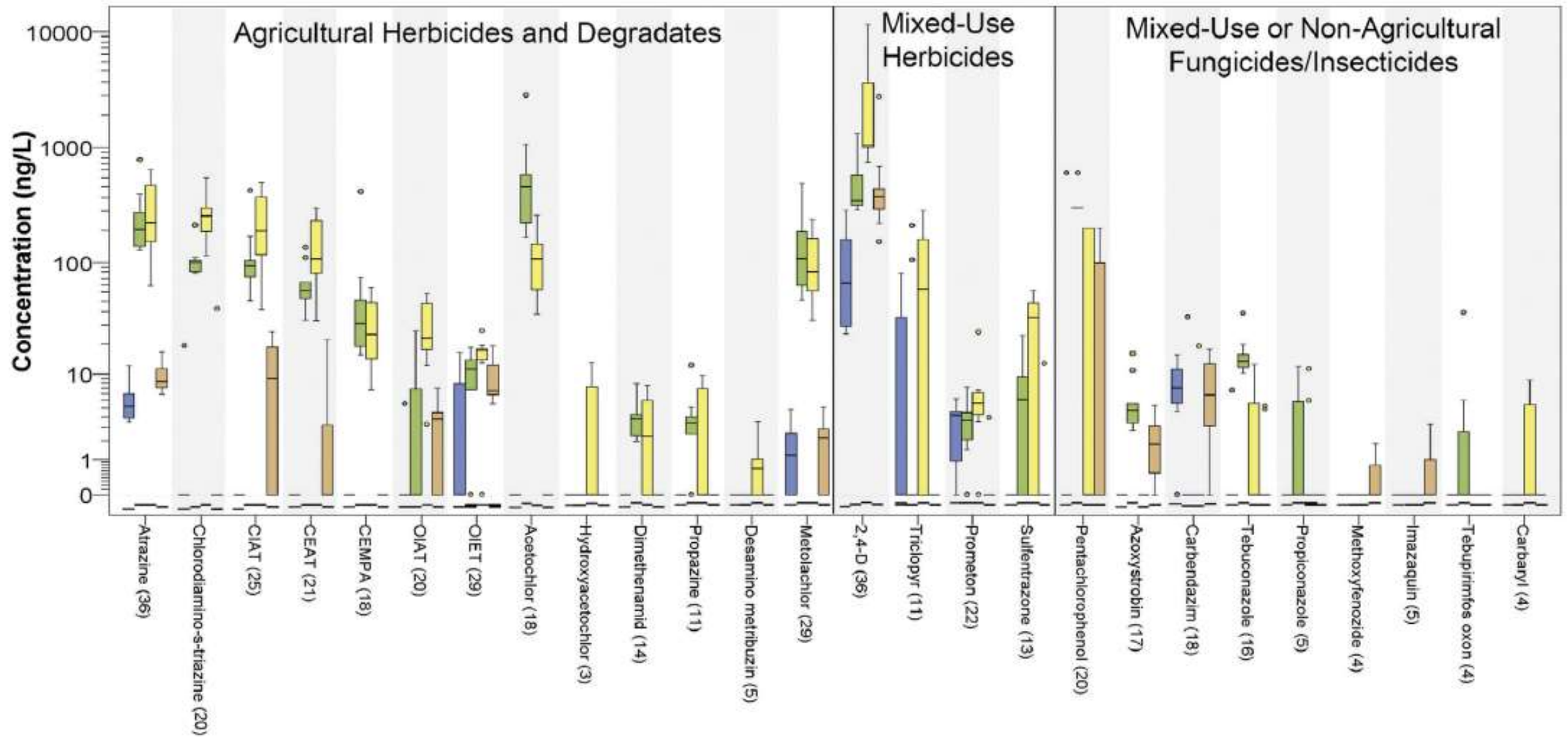
### 3. Preparing for journal submission.

Figures should be information rich:





Winter Spring Early Summer Late Summer



### 3. Preparing for journal submission.

#### Results

- Parallel structure with Introduction and Methods.
- No redundancies in figures, tables, text
- Be brief and highlight key points
- Tables/Figures order matches order in text.

### 3. Preparing for journal submission.

#### Discussion

- Start narrow and then broaden.
- Do not rehash the results.
- Compare and contrast to existing literature.
- Be specific “*concentrations in Smith et al. (2021) were greater*” is a meaningless statement!

### 3. Preparing for journal submission.

#### Conclusions

- NOT another abstract or summary.
- Free-standing conclusions that transcend the science.

*“The declining accuracy of weather models suggest that climate change is affecting the reliability of hurricane models.”*

*“Our study demonstrates that matrix effects need to be taken into consideration in future studies.”*



### 3. Preparing for journal submission.

#### References

- All statements need to be supported by references.
- References should be current – unless they are foundational or seminal to the area of research.
- Reference formatting is YOUR responsibility. Use a program (Mendeley, Endnote, etc.) and double check.

## 4. Submission

- *Review Guide for Authors*
- Have all files ready, in one place, in one common naming format, in one folder.
- Use plagiarism software (*TurnItIn* or similar) to double check your text.
- Use editing software (*Grammarly* or similar) to double check your text.

# 4. Submission

Fairbairn_Water Res 2018	✓ ▶	1_MANUSCRIPT	✓ ▶	0 SUBMISSION	✓ ▶	0 Korn_Cover Letter	✓
Feifarek_SALT	✓ ▶	AECT_Example'19.pdf	✓	1 TEXT	✓ ▶	1 Korn_Manuscript_II_6.17.19	✓
Guyader_Lake Septic_II_STOTEN	✓ ▶	AECT-D-19-00292.pdf	✓	2 TABLES	✓ ▶	2 Figure 1_Korn.tif	✓
Guyader_LakeSeptic	✓ ▶	cropped images	✓ ▶	3 FIGURES	✓ ▶	3 Figure 2_Korn.tif	✓
Hillmann_Whale Larynx 97	✓ ▶	E Proofs_4.5.20	✓	4 SUPPLEMENTALS	✓ ▶	4 Figure 3_Korn.tif	✓
Hyndman_AquatToxicol_2010	✓ ▶	Estrone Analysis Procedure	✓	5 DATA Files	✓ ▶	5 Data supplement_Korn.xlsx	✓
Ivanova_PLOSONe	✓ ▶	Estrone Samples January 2018	✓	6 CITED PDFs	✓ ▶		
Jorgenson_POCIS_Environ Poll'18	✓ ▶	Estrone Samples January 2018_9.13.18.xlsx	✓	7 Other Resources	✓ ▶		
Jorgenson_Silvery Minnow AECT'14	✓ ▶	Figure1.tif	✓	8 old ms files	✓ ▶		
Julius_Phylogenetic Exercise 06	✓ ▶	Figure2A.tif	✓	9 Revisions	✓ ▶		
Kawano_Dominica Selection	✓ ▶	Figure2B.tif	✓				
Kiesling_JAWRA La Crosse	✓ ▶	Figure2C.tif	✓				
Kohno_Alligator_sex_determination	✓ ▶	Figure2D.tif	✓				
Kohno_ApplToxicol	✓ ▶	Figure2E.tif	✓				
Kolok_Bioscience 11	✓ ▶	Figure2F.tif	✓				
Kolok_ES&T Feature 11	✓ ▶	Figure3A.tif	✓				
Kolok_MMU	✓ ▶	Figure3B.tif	✓				
Korn_Predation_II	✓ ▶	Figure3C.tif	✓				
Lagarde_juvenile_morpho	✓ ▶	Figure3D.tif	✓				
Lee_JAWRA 2013	✓ ▶	Final thesis figures	✓ ▶				
Leonard_J Fish Biology	✓ ▶	Pauls comments	✓				
Lesteberg_Larval Histology	✓ ▶	Supplementary.F.CF.tif	✓				
Maie Eleotrid MS	✓ ▶	Thesis PowerPoint	✓ ▶				
Maie Feeding performance Linnean Soc	✓ ▶						

# 4. Submission Documents

- Article type
- Full title
- Short title
- Corresponding author – full address
- Keywords
- Abstract
- Order of Authors and contributions
- Opposing reviewers
- Suggested reviewers (4-8, with email & rationale)
- Financial disclosure & competing interests
- Ethics statement, human subject statement, animal statement
- Field permit
- Data availability

## 4. Submission

- Review *Guide for Authors*
- Have all files ready, in one place, in one common naming format, in one folder.
- Take your time
- Review submission proof
- SUBMIT

# 4. Submission

- Review submission proof
- **SUBMIT**

Manuscript Number:	
Article Type:	Research Article
Full Title:	Contaminants of Emerging Concern in Tributaries to the Laurentian Great Lakes: II. Biological Consequences of Exposure
Short Title:	Great Lakes Contaminants of Emerging Concern Biological Effects
Corresponding Author:	Heiko Lars Schoenfuss, PhD St. Cloud State University Saint Cloud, MN UNITED STATES
Keywords:	estrogens; pharmaceuticals; fish; histology; populations
Abstract:	The Laurentian Great Lakes contain one fifth of the world's surface freshwater and have been severely impacted by human activity since the Industrial Revolution. In addition to legacy contaminants, nitrification and invasive species, this aquatic ecosystem is also the recipient of Contaminants of Emerging Concern (CECs) with poorly understood biological consequences. In the current study, we documented biological effects of CECs across 27 field sites in six Great Lakes tributaries by examining over 2250 resident and caged sunfish ( <i>Lepomis ssp.</i> ) for a variety of morphological and physiological endpoints and related these results to CEC occurrence. The resultant data matrices were rich and complex, and only the Fox River exhibited consistent adverse biological effects, including increased relative liver size, greater prominence of hepatocyte vacuoles and increased plasma glucose concentrations. Further integration of the entire chemical and biological data matrix using Canonical Redundancy Analysis revealed consistent patterns of biological consequences of CEC exposure. Increasing plasma glucose concentrations, likely as a result of pollutant-induced metabolic stress, was associated with increased relative liver size and greater prominence of hepatocyte vacuoles. These indicators of pollutant exposure were inversely correlated with indicators of reproductive potential including smaller gonad size and less mature gametes. The current study highlights the need for greater integration of chemical and biological studies and suggests that CECs in the Laurentian Great Lakes Basin may adversely affect the reproductive potential of exposed fish populations.
Order of Authors:	Linnea M Thomas Zachary G Jorgenson Mark E Brigham Steve J Choy Jeremy N Moore Jo A Banda Daniel J Gefell Thomas M Minarik Heiko Lars Schoenfuss, PhD
Opposed Reviewers:	Peter W Sorenson University of Minnesota Twin Cities  Former post-doctoral advisor with whom the corresponding author is not on speaking terms  Vicky Blazer US Geological Survey



## 4. Submission



em.aect.0.640531.9d44e1de@editorialmanager.co  
m

on behalf of

Archives of Environmental Contamination and Toxi  
cology (AECT) <em@editorialmanager.com>

Wed 6/19/2019 9:18 AM

To: Schoenfuss, Heiko L. <hschoenfuss@stcloudstate.edu>



Dear Dr. Schoenfuss,

Thank you for submitting your manuscript, Temperature-Dependent Biomarkers of Estrogenic Exposure in a Piscivore Freshwater Fish, to Archives of Environmental Contamination and Toxicology.

The submission id is: **AECT-D-19-00292**

Please refer to this number in any future correspondence.

During the review process, you can keep track of the status of your manuscript by log onto the journal's website.



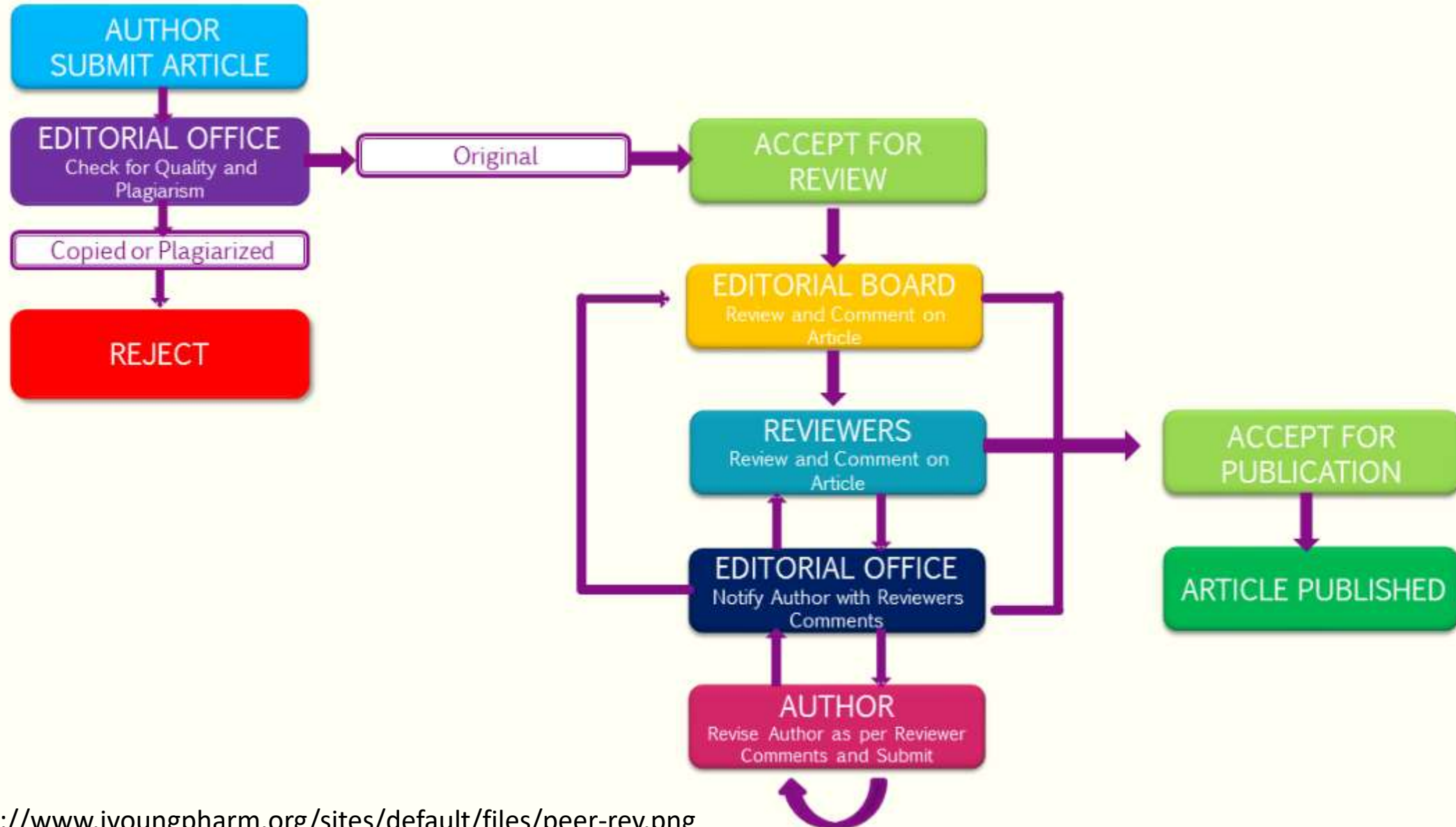


***WAIT.....***

***WAIT.....***

***WAIT.....***

# 5. Peer Review



# 5. Peer Review – Ethics Rejects

[www.wiley.com/network/researchers](http://www.wiley.com/network/researchers)



# 6. Revisions or Rejection?!



Kevin Thomas <eesserver@eesmail.elsevier.com>

Mon 6/15/2020 5:24 PM



Ms. Ref. No.: STOTEN-D-20-00278R1

Title: Pollution in Paradise: Assessing Occurrence and Biological Consequences of Contaminants of Emerging Concern on Oceanic Islands

Journal: Science of the Total Environment

Dear Dr. Heiko Lars Schoenfuss,

Please see below the referees' comments on your manuscript "Pollution in Paradise: Assessing Occurrence and Biological Consequences of Contaminants of Emerging Concern on Oceanic Islands". As you can see, the reviewers continue to have major concerns about the paper even after the opportunity to revise. Publishing in STOTEN is becoming increasingly competitive and while in some cases the referee's comments are not completely negative, there is limited space in the journal. With this in view, we have to prioritize papers that we publish and some good quality articles sometimes cannot be accommodated. Unfortunately, we can no longer consider the paper

for publication in STOTEN. I hope that the enclosed comments will assist you in revising it for possible publication elsewhere.

In spite of the fact that the review did not go in your favor this time, we hope that you will continue to submit to STOTEN.

Sincerely yours,

Kevin Thomas  
Associate Editor  
Science of the Total Environment

# 6. Revisions or Rejection?!

A

em.aect.0.6849f1.b7f8c931@editorialmanager.com  
on behalf of  
Archives of Environmental Contamination and Toxicology (AECT) <em@editorialmanager.com>  
Mon 12/30/2019 3:42 PM  
To: Schoenfuss, Heiko L

Dear Dr. Schoenfuss,

We have received the reviewer comments for your manuscript entitled "Temperature-Dependent Biomarkers of Estrogenic Exposure in a Piscivore Freshwater Fish". Based on these reviews, I have decided that your manuscript may be acceptable for publication in Archives of Environmental Contamination and Toxicology after Major Revisions.

However, I will require a detailed reply to each of the reviewer comments and a suitably revised manuscript. When preparing your revised manuscript, you are asked to carefully consider the reviewer comments below. It may be necessary to submit the revised manuscript to further review.

Please note: When uploading your revised files, please make sure only to submit your editable source files (i. E. Word, tex).

Please submit your revised manuscript by 28 Feb 2020 using the Editorial Manager system:



# 7. “Response to Reviewers”

7. Line 121 - Why did you need 4 separate ethanol tanks per temperature? Essentially double the experimentally-treated animals, at each of 4 temperatures? Why then are sample sizes the same for some treatment groups (fig 1, etc.) or double for other groups?

**We should have explained this better in our experiment design. Since each of the two estrone treatments (estrone low/ estrone high) had to be paired up with control sunfish and as we did not reuse control sunfish to avoid confounding results as a result of sunfish experience, we needed to have twice as many control sunfish as sunfish in each estrone treatment. In other words, one control sunfish to be paired with E1 Low, one with E1 High.**

8. More detail is needed on the biomarker analyses. Were these kits, performed exactly according to the reference listed? More descriptive detail is needed overall, but specifying any/all variation is also needed for primary outcomes of this paper.

**We added additional detail.**

9. No description is provided at all for the histology.

**We are not sure if the reviewer is referring to the process of creating the histological sections (Lines 213-220; cited Thomas et al., 2017 manuscript) or the visual analysis (Lines 220-227). In either case, we added a supplemental figure to highlight the features that were analyzed Fig S1.**

10. What were the prescribed test concentrations of estrone? The procedure seems to lend towards inaccurate dosing... was an approximate concentration only desired? Appreciate the analytical results, but also would like to know how far off this was from the desired dosing.

**Our laboratory has almost 20 years of experience with our exposure system using estrogens as treatment chemicals. In our system, we usually experience a 25% lower estrone concentration than the calculated concentration. As a result, we calculated a 25% overage when preparing our stock solutions. Final, measured concentrations were within approximately 10% of our target concentrations.**

# 7. Resubmission

1_MANUSCRIPT	✓▶	0 SUBMISSION	✓▶	AECT-D-19-00292_Data supplement_Korn.xlsx	✓
AECT_Example'19.pdf	✓	1 TEXT	✓▶	AECT-D-19-00292_Manuscript_revised	✓
AECT-D-19-00292.pdf	✓	2 TABLES	✓▶	AECT-D-19-00292_R1.pdf	✓
cropped images	✓▶	3 FIGURES	✓▶	AECT-D-19-00292_Response to Reviewers	✓
E Proofs_4.5.20	✓	4 SUPPLEMENTALS	✓▶	AECT-D-19-00292_Suppl_Fig_S1_Liver_ranking.jpg	✓
Estrone Analysis Procedure	✓	5 DATA Files	✓▶	AECT-D-19-00292_Suppl...ovary_testis_Allstages.jpg	✓
Estrone Samples January 2018	✓	6 CITED PDFs	✓▶	Companion Manuscript_Reduced.pdf	✓
Estrone Samples January 2018_9.13.18.xlsx	✓	7 Other Resources	✓▶	Companion Manuscript.docx	✓
Figure1.tif	✓	8 old ms files	✓▶	Companion Manuscript.pdf	✓
Figure2A.tif	✓	9 Revisions	✓▶		
Figure2B.tif	✓				
Figure2C.tif	✓				
Figure2D.tif	✓				
Figure2E.tif	✓				
Figure2F.tif	✓				
Figure3A.tif	✓				
Figure3B.tif	✓				
Figure3C.tif	✓				
Figure3D.tif	✓				
Final thesis figures	✓▶				
Pauls comments	✓				
Supplementary.F.CF.tif	✓				
Thesis PowerPoint	✓▶				

# Acceptance






8. Proof

Our reference: STOTEN 12728 P-authorquery-v8

AUTHOR QUERY FORM

	<b>Journal:</b> STOTEN  <b>Article Number:</b> 12728	Please e-mail or fax your responses and any corrections to: <b>E-mail:</b> <a href="mailto:corrections.esil@elsevier.spitech.com">corrections.esil@elsevier.spitech.com</a> <b>Fax:</b> +1 619 699 6721
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Dear Author,

Any queries or remarks that have arisen during the processing of your manuscript are listed below and highlighted by flags in the proof. Please check your proof carefully and mark all corrections at the appropriate place in the proof (e.g., by using on-screen annotation in the PDF file) or compile them in a separate list.

For correction or revision of any artwork, please consult <http://www.elsevier.com/artworkinstructions>.

Any queries or remarks that have arisen during the processing of your manuscript are listed below and highlighted by flags in the proof. Click on the 'Q' link to go to the location in the proof.

Location in article	Query / Remark: <a href="#">click on the Q link to go</a> Please insert your reply or correction at the corresponding line in the proof
Q1	Citation "Ramirez et al., 2006" has not been found in the reference list. Please supply full details for this reference.
Q2	Citation "Mitchelmore et al., 2006" has not been found in the reference list. Please supply full details for this reference.
Q3	The country name "United States" has been inserted for the affiliations. Please check, and correct if necessary.
Q4	Journal style requires a maximum of 6 keywords. Please check.
Q5	Please check the page range in Ref. Brooks et al., 2003.
Q6	Please provide the volume number and page range for the bibliography in Ref. Lozano et al., 2011.
Q7	Please provide the volume number and page range for the bibliography in Ref. Schultz et al., 2011.
Q8	Please provide the volume number and page range for the bibliography in Ref. Schwab et al., 2005.
Q9	Please supply the name of the publisher.



Contents lists available at ScienceDirect

Science of the Total Environment

journal homepage: [www.elsevier.com/locate/scitotenv](http://www.elsevier.com/locate/scitotenv)



Effects of biologically-active chemical mixtures on fish in a wastewater-impacted urban stream

Larry B. Barber <sup>a,\*</sup>, Gregory K. Brown <sup>a</sup>, Todd G. Nettesheim <sup>b</sup>, Elizabeth W. Murphy <sup>b</sup>, Steven E. Bartell <sup>c</sup>, Heiko L. Schoenfuss <sup>c</sup>

<sup>a</sup> U.S. Geological Survey, 3215 Marine Street, Boulder, CO 80303, United States  
<sup>b</sup> U.S. Environmental Protection Agency, 77 West Jackson, Chicago, IL 60604, United States  
<sup>c</sup> St. Cloud State University, 720 Fourth Avenue South, St. Cloud, MN 56301, United States

ARTICLE INFO

**Article history:**  
Received 5 February 2011  
Received in revised form 15 June 2011  
Accepted 15 June 2011  
Available online xxx

**Keywords:**  
Wastewater  
Chemical mixtures  
Endocrine disruption  
Urban ecosystems  
Pharmaceutical  
Personal care products  
Bioaccumulation

ABSTRACT

Stream flow in urban aquatic ecosystems often is maintained by water-reclamation plant (WRP) effluents that contain mixtures of natural and anthropogenic chemicals that persist through the treatment processes. In effluent-impacted streams, aquatic organisms such as fish are continuously exposed to biologically-active chemicals throughout their life cycles. The North Shore Channel of the Chicago River (Chicago, Illinois) is part of an urban ecosystem in which >80% of the annual flow consists of effluent from the North Side WRP. In this study, multiple samplings of the effluent and stream water were conducted and fish (largemouth bass and carp) were collected on 2 occasions from the North Shore Channel. Fish also were collected once from the Outer Chicago Harbor in Lake Michigan, a reference site not impacted by WRP discharges. Over 100 organic chemicals with differing behaviors and biological effects were measured, and 23 compounds were detected in all of the water samples analyzed. The most frequently detected and highest concentration (>100 µg/L) compounds were ethylenediaminetetraacetic acid and 4-nonylphenolmono-to-tetraethoxycarboxylic acids. Other biologically-active chemicals including bisphenol A, 4-nonylphenol, 4-nonylphenolmono-to-tetraethoxylates, 4-tert-octylphenol, and 4-tert-octylphenolmono-to-tetraethoxylates were detected at lower concentrations (<5 µg/L). The biogenic steroidal hormones 17β-estradiol, estrone, testosterone, 4-androstene-3,17-dione, and cis-androsterone were detected at even lower concentrations (<0.005 µg/L). There were slight differences in concentrations between the North Side WRP effluent and the North Shore Channel, indicating minimal in-stream attenuation. Fish populations are continuously exposed to mixtures of biologically-active chemicals because of the relative persistency of the chemicals with respect to stream hydraulic residence time, and the lack of a fresh water source for dilution. The majority of male fish exhibited vitellogenin induction, a physiological response consistent with exposure to estrogenic compounds. Tissue-level signs of reproductive disruption, such as ovatestis, were not observed.

Published by Elsevier B.V.

1. Introduction

Large metropolitan centers place great demands on urban stream ecosystems, which must perform a number of essential functions such as wastewater disposal, transportation, recreation, and drinking

reclamation plants (WRPs) are discharged to the environment (Alder et al., 1990; Ahel et al., 1994a; Ternes et al., 1999; Barber et al., 2000). Once introduced into surface waters, contaminants can persist for considerable times and distances (Ahel et al., 1994b; Barber et al., 1996, 2006a,b; Ternes, 1998; Kolpin et al., 2002; Glassmeyer et al.,




# 9. Published !

Archives of Environmental Contamination and Toxicology (2020) 79:156–166  
<https://doi.org/10.1007/s00244-020-00726-x>



## Temperature-Dependent Biomarkers of Estrogenic Exposure in a Piscivore Freshwater Fish

V. R. Korn<sup>1</sup> · J. L. Ward<sup>2</sup> · P. L. Edmiston<sup>3</sup> · H. L. Schoenfuss<sup>1</sup> 

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### Abstract

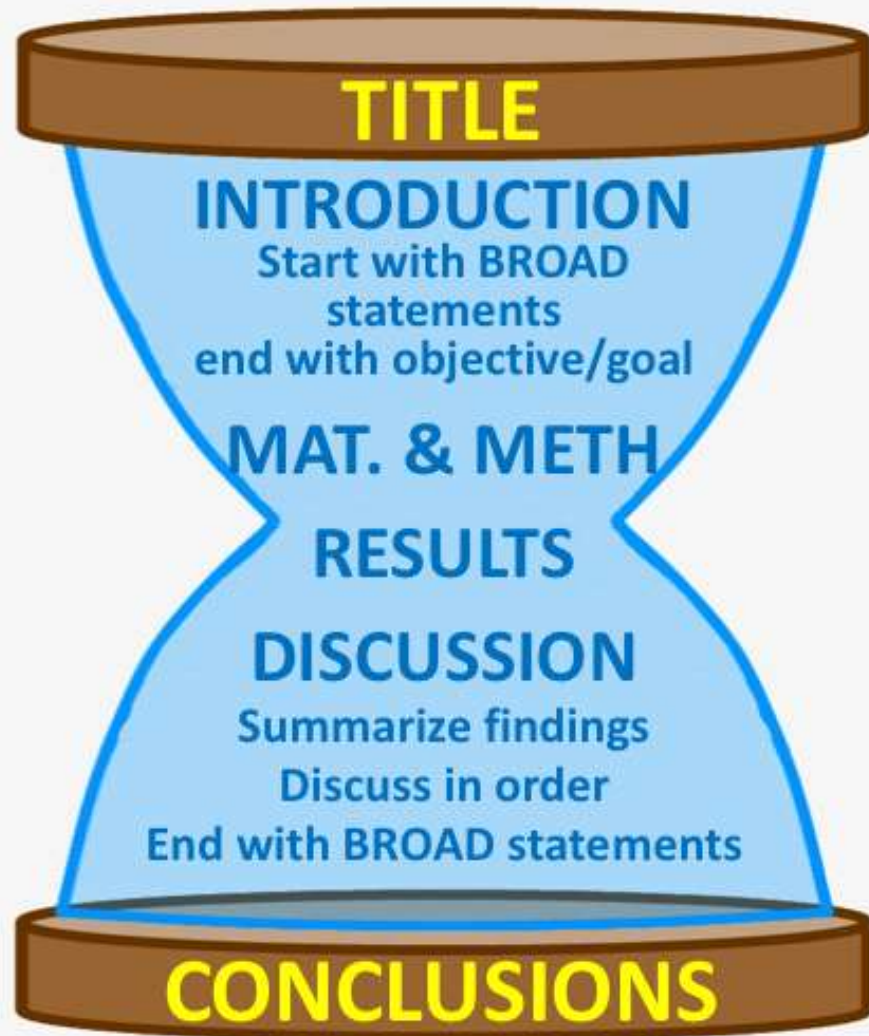
The biological effects of endocrine-active compounds and increasing water temperatures as a result of climate change have been studied extensively and independently, but there is a dearth of research to examine the combined effect of these factors on exposed organisms. Recent data suggest that estrogenic exposure and rising ambient temperatures independently impact predator–prey relationships. However, establishing these connections in natural settings is complex. These obstacles can be circumvented if biomarkers of estrogenic exposure in resident fish can predict changes in predator–prey relationships. To test the effects of estrone and temperature, the piscivore bluegill sunfish (*Lepomis macrochirus*) was exposed for 30 days to estrone at concentrations ( $90 \pm 17.6$  ng/L [mean  $\pm$  standard deviation] and  $414 \pm 146$  ng/L) previously shown to reduce prey-capture success. Exposures were conducted at four temperatures (15 °C, 18 °C, 21 °C, 24 °C) to simulate breeding season ambient temperatures across the natural range of this species. A suite of morphological and physiological biomarkers previously linked to estrogenic exposures were examined. Biomarkers of estrone exposure were more commonly and severely impacted in male fish than in female fish. Notably, the gonadosomatic index was lower and gonads were less mature in exposed males. Additionally, temperature modulated the effects of estrone similarly in males and females with fish exposed at higher temperatures typically exhibiting a decreased morphological index. This study provides evidence that alterations in hepatic function and gonadal function may cause shifts in metabolism and energy allocation that may lead to declining prey capture performance.

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# ***DISCLAIMER***

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Thank You  
&  
Good Luck!

