

To share or not to share....

Perspectives from fish telemetry
researchers on data sharing



Vivian M. Nguyen, Jill Brooks, Robert J.
Lennox, Neal Haddaway, Frederick G.
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Cooke

Data Sharing

Providing access to otherwise
privately stored data



To share

1. **Transparency:** verification and reproduction of research
2. **Accelerate scientific understanding:** more datasets, innovation, new developments
3. **Reduce cost** of research and increase **return on research investments**
4. **New ideas:** open discussion, different questions, test new hypotheses
5. **Institutional requirement:** funding agencies, journals

To share



[Data](#) [Surveys](#) [Instruments](#) [Collaboration](#) [Results](#) [Education](#) [Future](#) [Contact](#)

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Data sharing in astronomy lead to
mapping the Universe

The Sloan Digital Sky Survey: Mapping the Universe

...or not to share

- 1. Ethical and legal issues:** privacy, exploitation of information
- 2. Technical and logistical issues:** time and effort, lack of standardization, lack of IT support and structure
- 3. Motivational:** less time for their own publication, competitive risk (being scooped/challenged), lack of acknowledgement, lack of demand

Data sharing in animal telemetry

REVIEW

Aquatic animal telemetry: A panoramic window into the underwater world

Nigel E. Hussey¹, Steven T. Kessel¹, Kim Aarestrup², Steven J. Cooke³, Paul D. Cowley⁴, Aaron T. Fisk¹, Robert G. Harcourt⁵, Kim N. Holland⁶, Sara J. Iverson^{7,*}, John F. Kocik⁸, Joanna E. Mills Flemming⁹, Fred G. Whoriskey⁷



- Advances in technology revolutionized scope and scales of questions

“The next advance in aquatic telemetry will be the development of a global collaborative effort to facilitate infrastructure and data sharing and management over scales not previously possible.”

Data sharing in animal telemetry

Mechanisms for archiving and potentially sharing animal movement data

- **OTN** Ocean Tracking Network
- **AATAMS** Australian Animal Tracking and Monitoring Systems
- **Move Bank**
- **ATN** Animal Tracking Network
- **GLATOS** Great Lakes Acoustic Telemetry Observation System
- **GTOPP** Global Tagging of Pelagic Predators
- **Others.....**



Objectives

1. Identify **perceived barriers** to participation in sharing fish telemetry data in public databases
2. Identify examples of **benefits and pitfalls** of sharing data
3. Provide **recommendations** to foster data sharing in the fish telemetry research community

Social science approach: mixed methods

Interviews

Contacted known
“experts” in fish
telemetry

54 interviewed
at international
conferences

Online questionnaire

Sent 1841 e-mail invites to
authors mined in Web of
Science

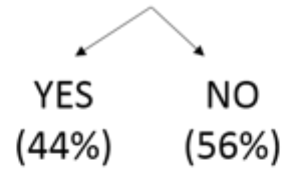
262 responses
from online
questionnaire

N= 314
fish telemetry
researchers

```
graph TD; A[Contacted known "experts" in fish telemetry] --> B[54 interviewed at international conferences]; C[Sent 1841 e-mail invites to authors mined in Web of Science] --> D[262 responses from online questionnaire]; B --> E[N= 314 fish telemetry researchers]; D --> E;
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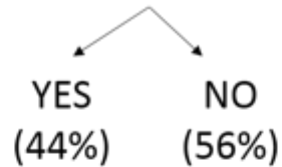
Current data sharing in fish telemetry

Share data? (N= 182)



Current data sharing in fish telemetry

Share data? (N= 182)

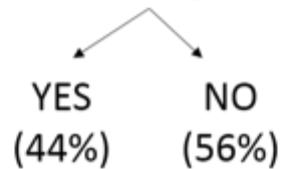


Concerns with sharing data?

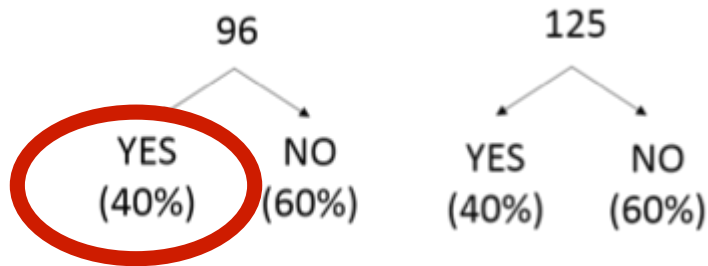
39% overall have concerns

Current data sharing in fish telemetry

Share data? (N= 182)



Concerns with sharing data?

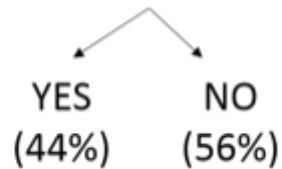


39% overall have concerns

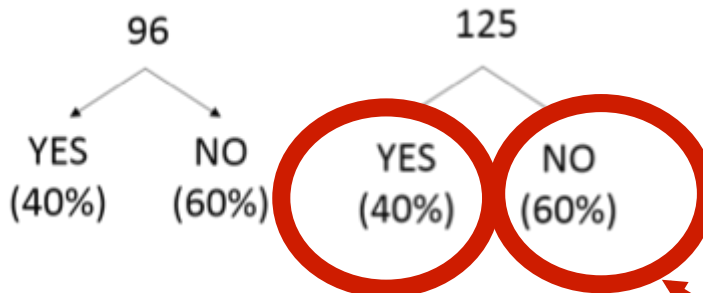
Lack of satisfaction with sharing procedures?

Current data sharing in fish telemetry

Share data? (N= 182)



Concerns with sharing data?



39% overall have concerns

Proportion that likely have not shared due to concerns

Proportion who might share but have not had opportunity

Concerns: 1) misuse of data

Concerns (coded)	Number of mentions
Misinterpretation of data	45
Data usage before publication	26
Ownership/proprietaryship of data	17
Lack of recognition	10
Exploiting animal information	8
Non-reciprocal sharing of data	3
Cost of sharing	3

Concerns: misuse of data

- Misinterpretation (45 x)

*One of the guys used my data as advertisement for sharing. I went to a meeting and he **presented my data wrongly**.... To me it emphasized that it was **dangerous to have data out there that anyone can pull off the web and do what they want.***

(Female, 20-29 years)

Concerns: misuse of data

- Misinterpretation (45 x)
- Exploitation of animal information (8 x)



Concerns: 2) lost of opportunity and ownership (motivational)

Concerns (coded)	Number of mentions
Misinterpretation of data	45
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Concerns: lost of opportunity and ownership

*Someone might **use the data before I get the chance to publish all my papers. It was expensive to collect and took a lot of effort!** Nonetheless once I have published all my papers I would be happy to publically archive the data- in fact I probably should. (Male, 30-39 years old)*

Concerns: 3) technical and logistical

Concerns (coded)	Number of mentions
Misinterpretation of data	45
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Concerns: technical and logistical

- Costly to share data (3x)

*Some of my funding agencies are beginning to require sharing of data, but are **not giving us the upfront tools or funding to make this a reality**.... Also, I sometimes work with very **large telemetry datasets** (some in the petabytes) and there is no such **data sharing service available that can handle this large of a dataset.***

(Male, 30-39 years old, North America)

Have any concerns materialized?

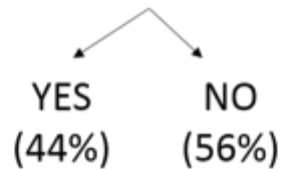
- 28% = YES (11 out of 39)

*I had one project where we collected a fair bit of telemetry data on [species]...it was challenging... huge design phase with telemetry to build tag for small [species]. We recaptured individuals to put new transmitter...we shared info with another researcher and then **ultimately a publication came out of it with zero acknowledgement.***

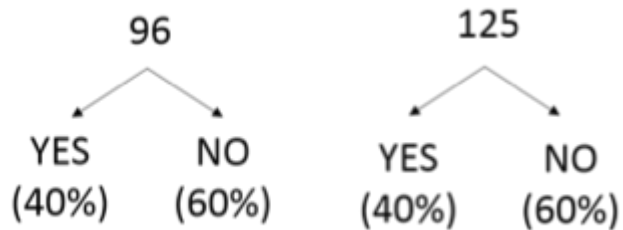
(Male, 40-49 years old)

Current data sharing in fish telemetry

Share data? (N= 182)



Concerns with sharing data?

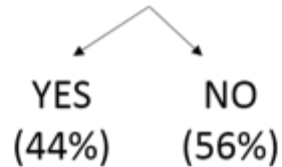


Used shared data?

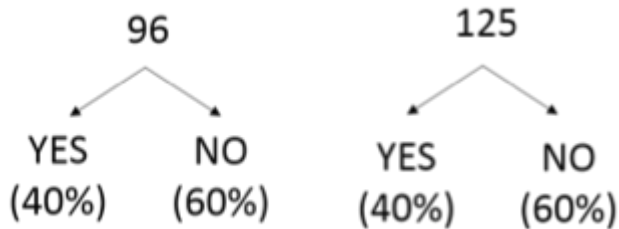
32% overall have
used shared data

Current data sharing in fish telemetry

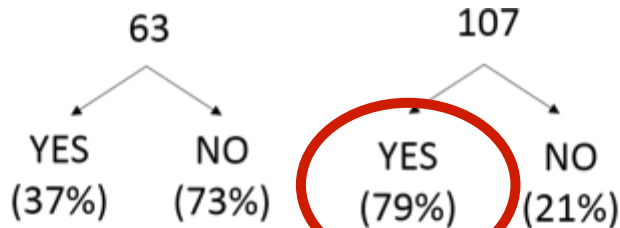
Share data? (N= 182)



Concerns with sharing data?



Used shared data?

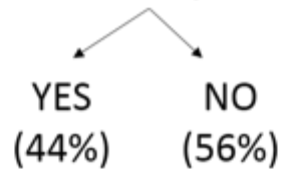


32% overall have used shared data

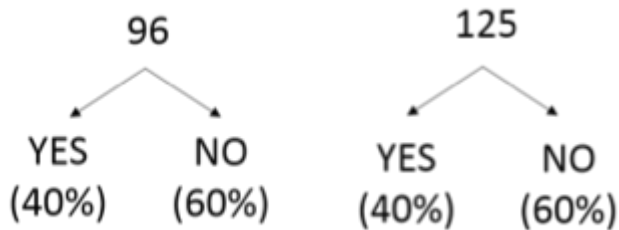
High % who use but don't share telemetry data

Current data sharing in fish telemetry

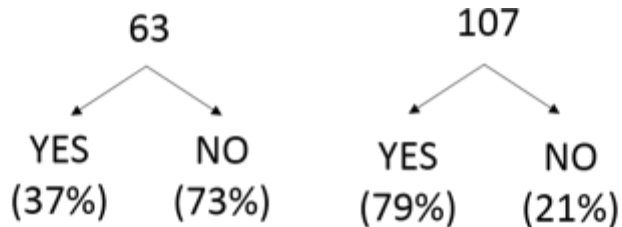
Share data? (N= 182)



Concerns with sharing data?



Used shared data?

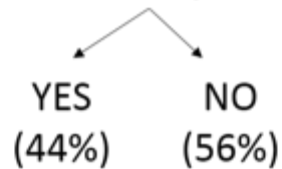


Benefitted from sharing data?

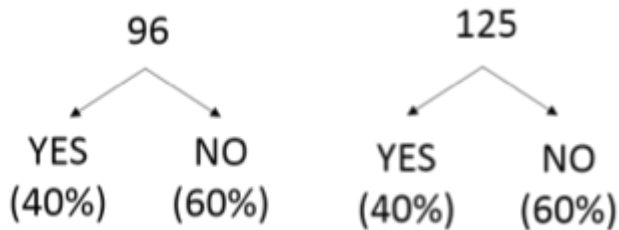
34% overall have
benefitted from
sharing data

Current data sharing in fish telemetry

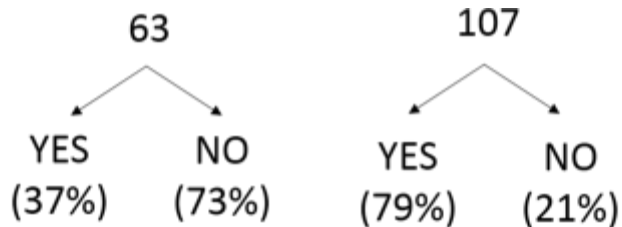
Share data? (N= 182)



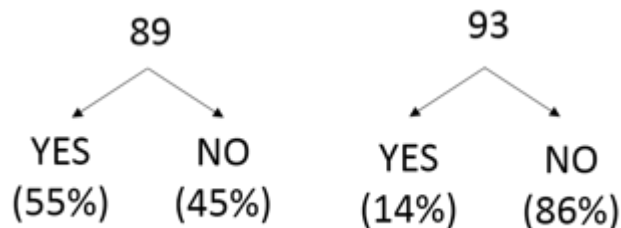
Concerns with sharing data?



Used shared data?



Benefitted from sharing data?



34% overall have benefitted from sharing data

Benefits: 1) Tackling more questions and complex problems

Benefit (coded)	Number of mentions
Increased geographic coverage	28
Collaborations	24
Publication	11
Outreach and community involvement	6
Establishment and respect within scientific community	3
Grants	3
Management and policy change	2
Co-authorship	2
Employment	1

Benefits: 2) Personal benefits

Benefit (coded)	Number of mentions
Increased detection range	28
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Benefits: 3) Influence community and policy

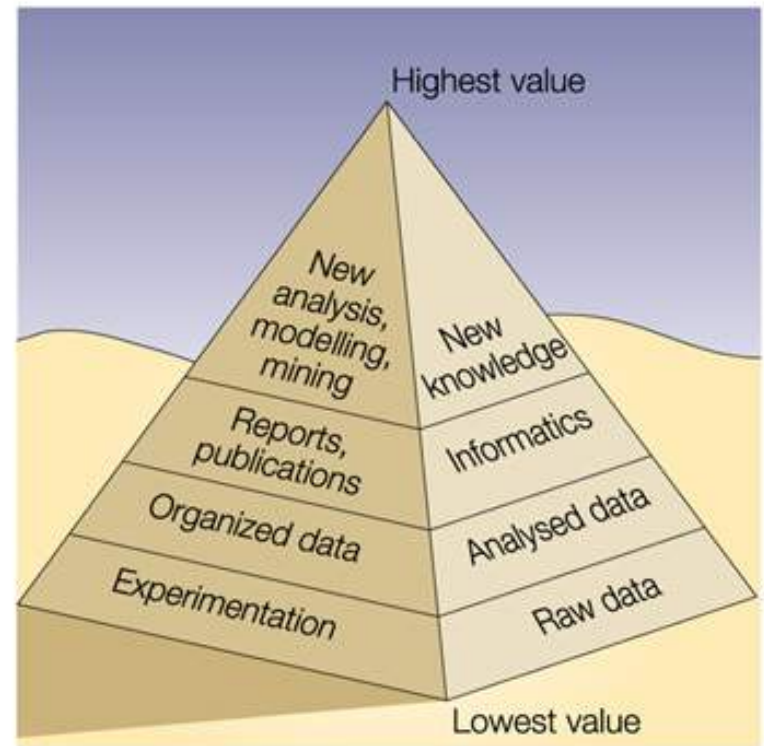
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Way Forward: Recommendations

- Data sharing as norm in fish telemetry

1. Raising awareness of the benefits and value of sharing fish telemetry data

- Personal benefits
- Community and conservation benefits

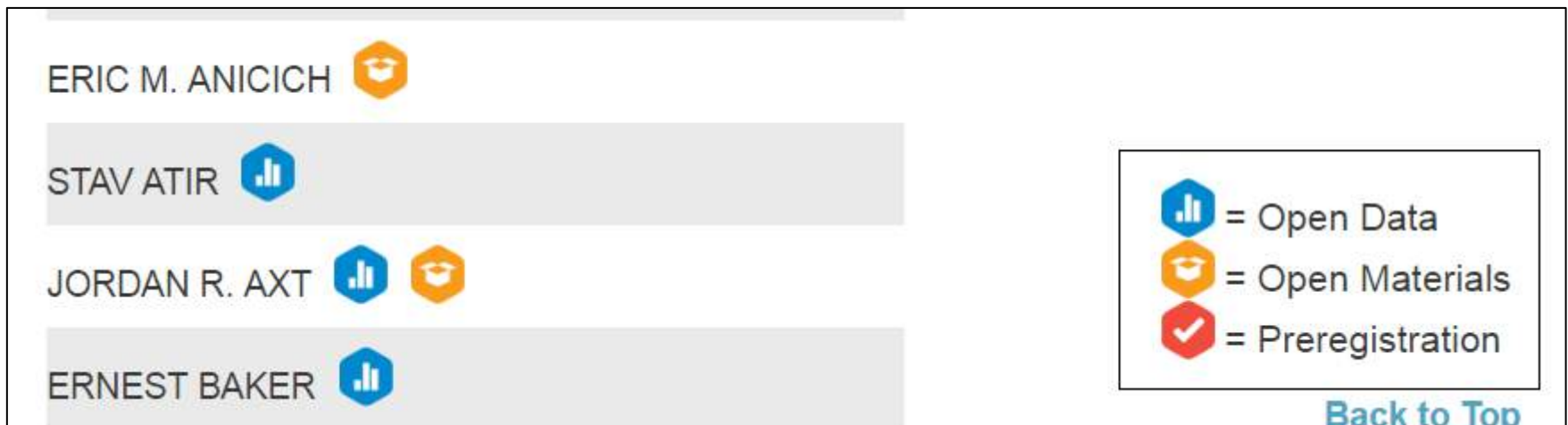



Way Forward: Recommendations


- Data sharing as norm in fish telemetry
2. Rules, protocols, enforcement and norms need to be established by telemetry databases
 - Citing datasets
 - Flexible embargo services controlled by researcher


Way Forward: Recommendations


- Data sharing as norm in fish telemetry
3. Funding agencies, institutions, journals can act as stewards for data sharing by restructuring rewards and incentives
- Recognition for sharing (Badges earned in *Psychological Science*)






ERIC M. ANICICH 

STAV ATIR 

JORDAN R. AXT  

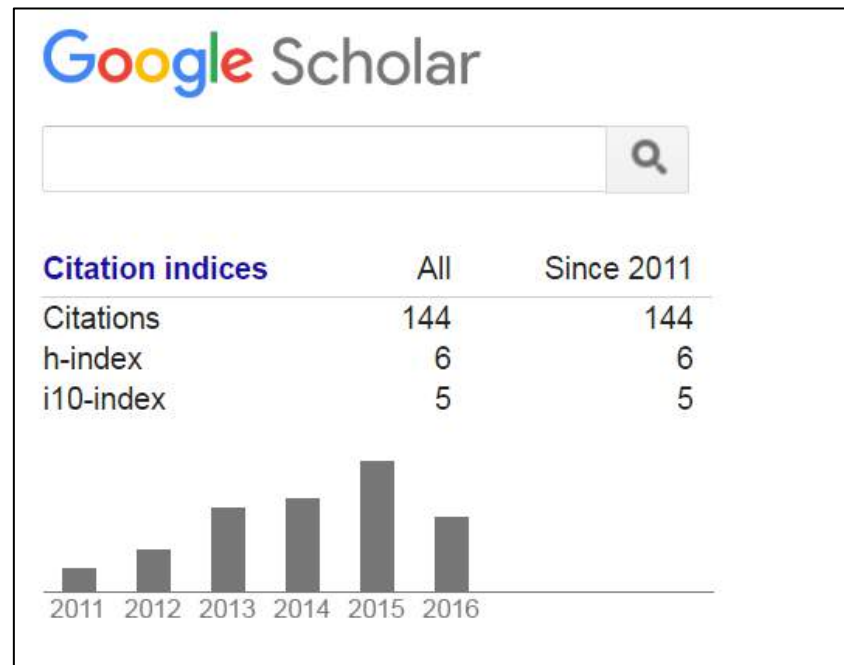
ERNEST BAKER 

 = Open Data
 = Open Materials
 = Preregistration

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Way Forward: Recommendations

- Data sharing as norm in fish telemetry
3. Funding agencies, institutions, journals can act as stewards for data sharing by restructuring rewards and incentives



Way Forward: Recommendations

- Data sharing as norm in fish telemetry
-
4. Standardizing data and fostering data management skills as a prerequisite for data sharing
 - Identify appropriate data standardization prior to project start
 - Provide IT support and structure for easy sharing
 - Improve quality of data for reuse

Conclusion

- Findings can assist:
 - Leadership of telemetry networks
 - Developing data sharing mechanisms that address researcher concerns
- Tangible examples of benefits and pitfalls of sharing
- Move towards a culture of sharing similar to genomics and astronomy to advance fisheries management and conservation

Acknowledgements

- Thank you to all participants who participated!
- Thank you to OTN for logistical support



Thank you! Questions?



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Demographic data

Variables	Freq	%	Variables	Freq	%	Variables	Freq	%
Gender (n = 222)			Number of projects as principal investigator (n = 280)			Number of refereed articles (n=253)		
Female	40	18	None	68	24	1-4	140	55
Male	182	82	1-4	131	47	5-9	60	24
Employer (non- mutually exclusive)			5-9	45	16	10-14	18	7
Academia	146		10-14	12	4	15-20	13	5
Federal government	86		>15	24	9	21-25	2	<1
Provincial or state government	54		Location (n = 212)			26+	20	8
Industry	8		N America	141	67	Number of non-refereed Articles (n=209)		
NGO/NPO	21		Europe	36	17	1-4	118	56
Private	19		S Pacific	16	7.5	5-9	44	21
Telemetry experience (n= 220)			United Kingdom	6	3	10-14	18	9
1-4 years	47	21	Asia	5	2	15-20	13	6
5-9 years	74	34	Central and S America	5	2	21-25	2	<1
10-20 years	71	32	South Africa	2	1	26+	14	7
>20 years	28	13	Middle East	1	0.5	Telemetry portion of research (n=220)		
Age (n=222)			Research Environment (n =224)			<10%	58	26
20-29 years	20	9	Marine	87	39	10-25%	42	19
30-39 years	88	40	Freshwater	53	24	26-50%	54	25
40-49 years	58	27	Both	84	37	51-75%	26	12
50-59 years	38	17	Telemetry Method (non-mutually exclusive)			>75%	40	18
60-69 years	14	6	Radio	107		Telemetry Network (n=302)		
70 + years	3	1	Acoustic	200		Yes	123	55
			Satellite	70		No	99	45

To share



- Common genetic variants that occur in human beings
- Lead to new methods of preventing, diagnosing and treating disease



- DNA sequencing and protein structures identified
- Support and progress scientific research across globe



**NCBI
GenBank**

Questions

1. Do you share your telemetry research data?
2. Do you have concerns with sharing research data? Describe.
3. Have any of those concerns actually materialized? Describe.
4. Have you benefited from publicly sharing your data? Describe.

Questions

- *Do you share your telemetry research data in publicly available databases?*
- *Do you have concerns with sharing research data in publicly available databases? If yes, please describe those concerns.*
- *Have any of those concerns actually materialized? (e.g., did your concerns come to reality?) Please describe.*
- *Have you benefited from publicly sharing your data (i.e. has anything grown or developed out of sharing your data)? If yes, how?*
- *Have you used shared data for your own research related to fish telemetry? If yes, please describe how it was used?*