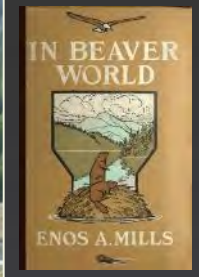
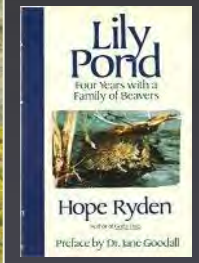
Partnering with Beaver to Restore Wetland

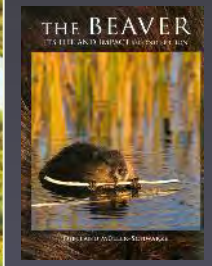
By Mark Beardsley and Jessica Doran

Thank you to Mike form Saskatoon, for permission to use his video.
Mike and Dawn's Saskatchewan Wildlife Videos on YouTube.

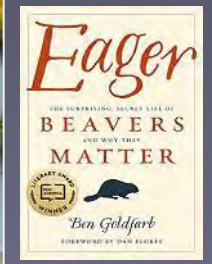

Beaver appreciation


IN BEAVER WORLD
ENOS A. MILLS


Lily Pond
Four Years with a Family of Beavers
Hope Ryden
Preface by Dr. Jane Goodall

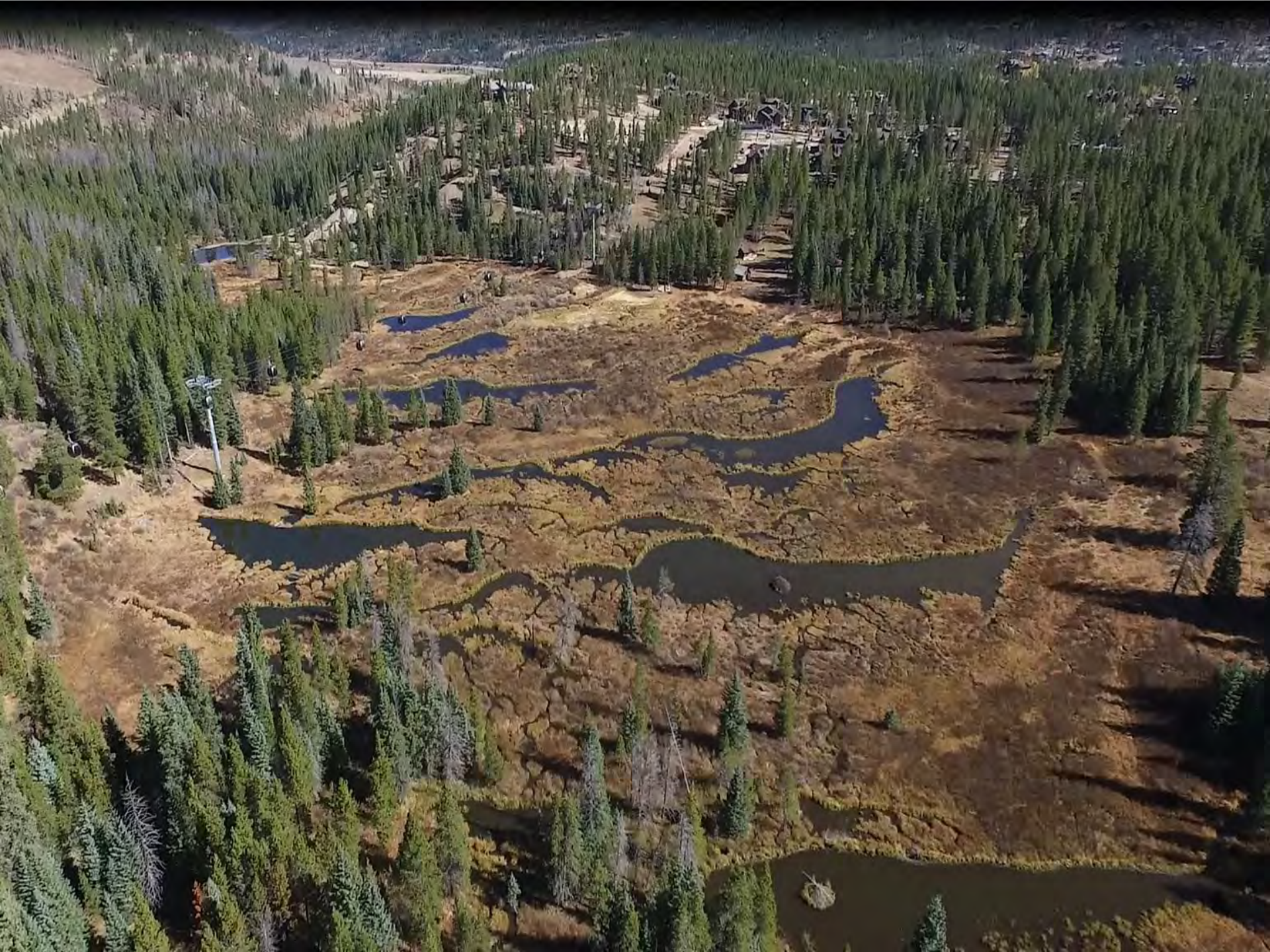

THE BEAVER


SAVING THE DAMMED
ELLEN WOHL


Eager
BEAVERS
MATTER
Ben Goldfarb

Adapted from Figure 1.7 (p 36) of Shahverdian et al. (2019) – Chapter 1 LTPBR Manual DOI: 10.13140/RG.2.2.14138.03529


Reimagine what riverscapes could



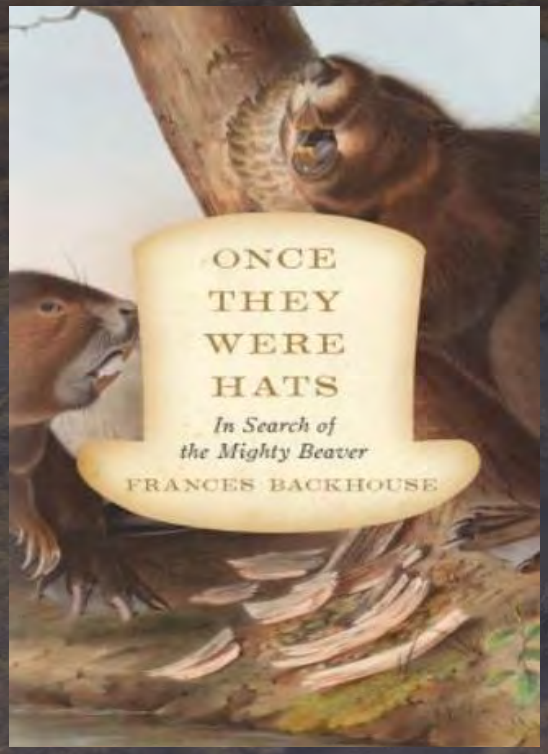
Our relationship with beaver

Coexistence

Our relationship with beaver

Coexistence

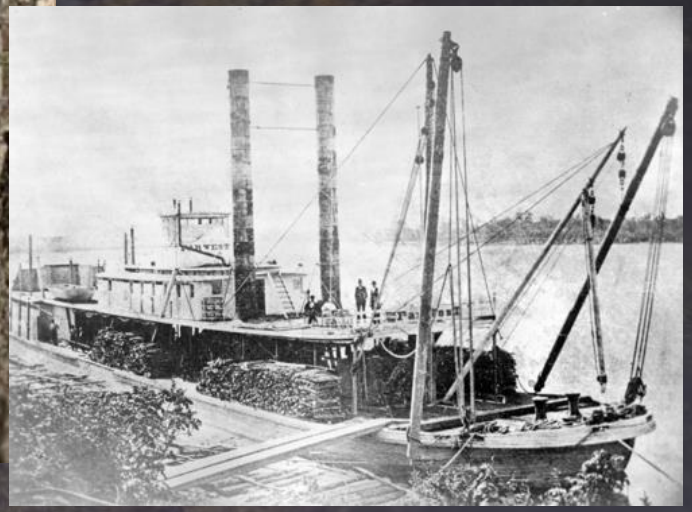
Commodification



Our relationship with beaver

Coexistence

Commodification



Our relationship with beaver

Coexistence

Commodification

Competition

Our relationship with beaver

Coexistence

Commodification

Competition

Our relationship with beaver

Coexistence

Commodification

Competition (Conflict)

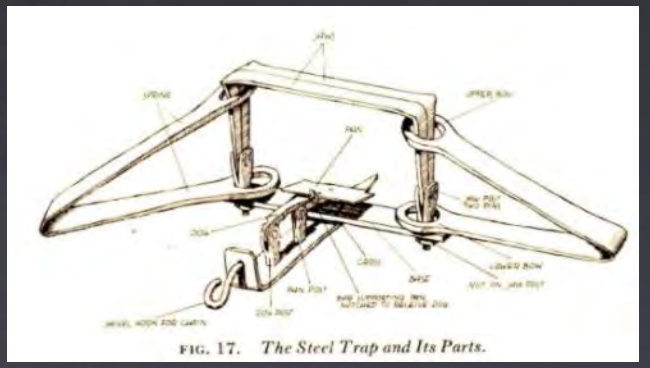


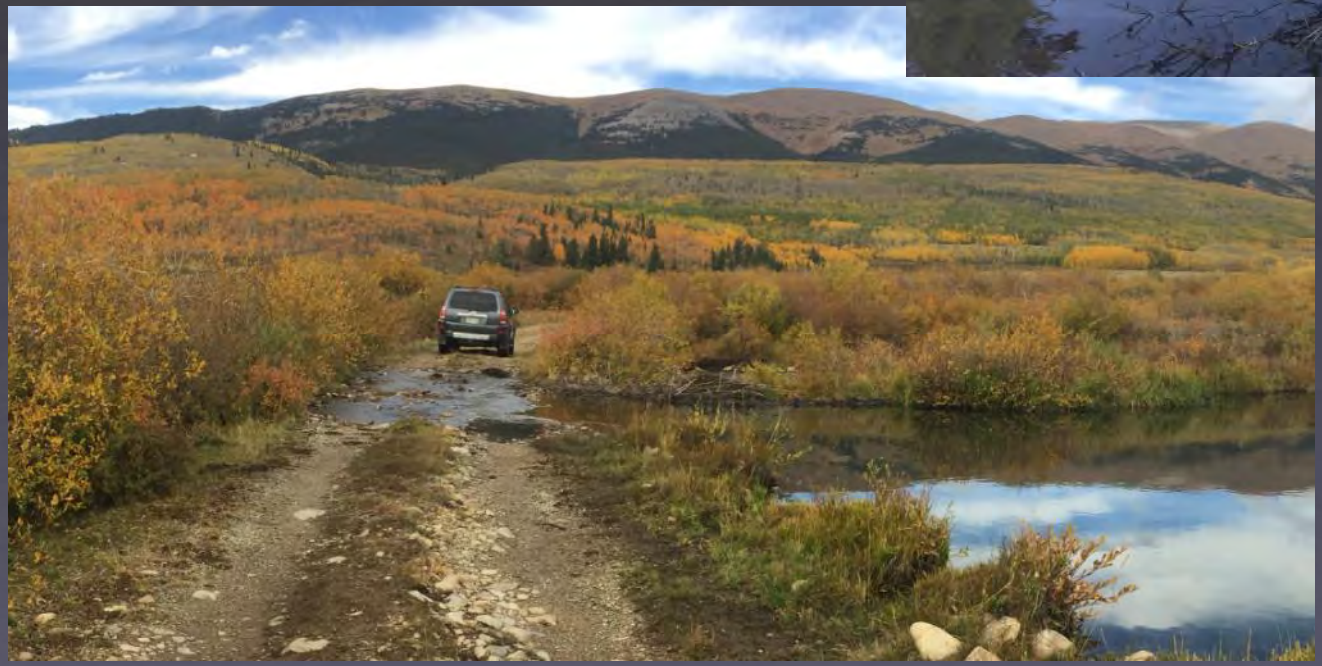
FIG. 17. *The Steel Trap and Its Parts.*

Our relationship with beaver

Coexistence

Commodification

Competition (Conflict)



The Beaver INSTITUTE™

BEAVER CORPS

Our relationship with beaver

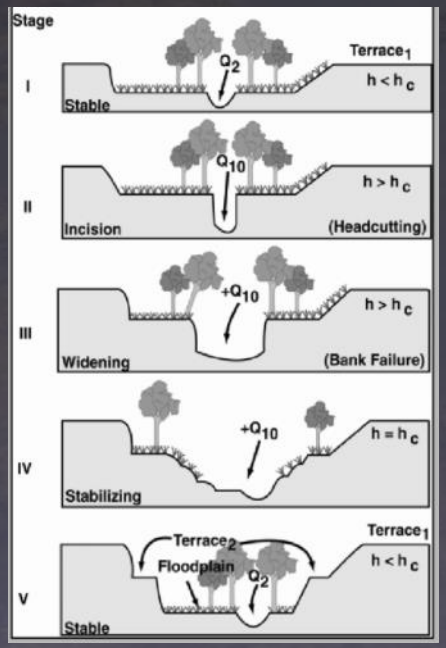
Coexistence

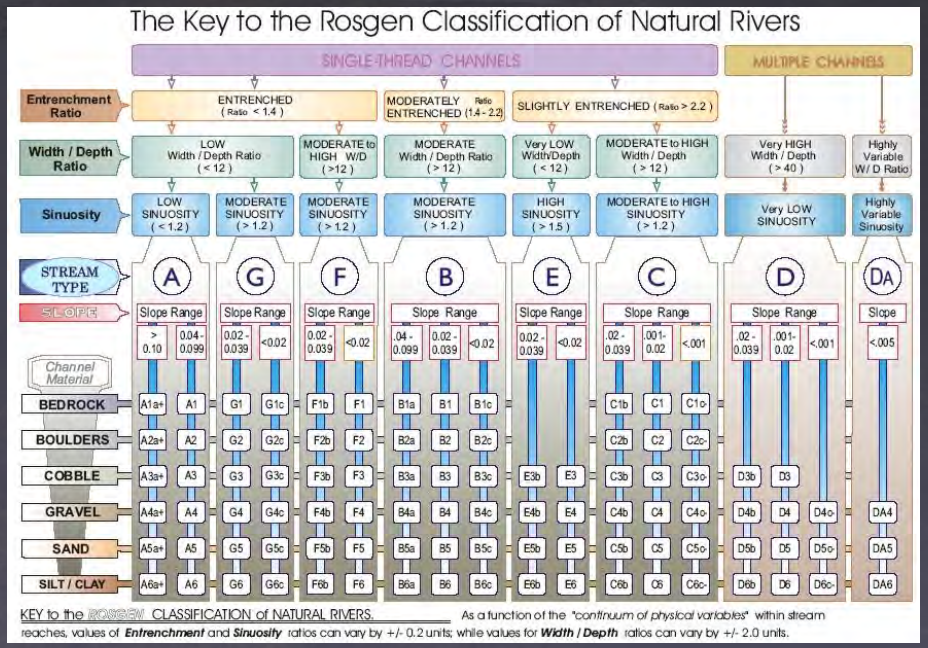
Commodification

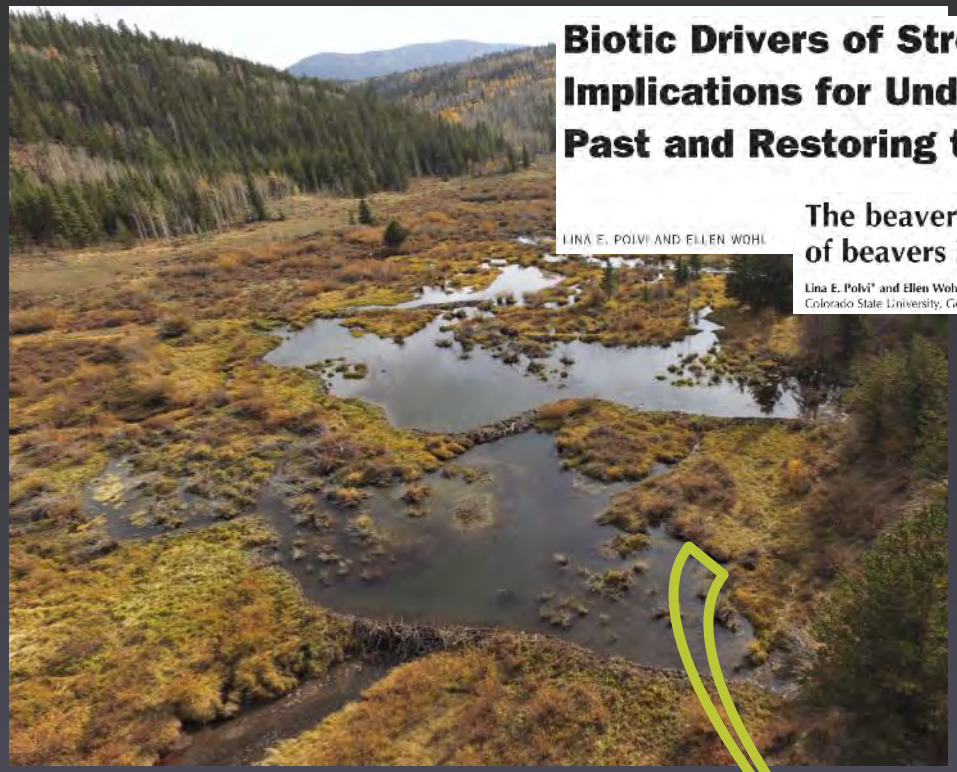
Competition (Conflict)

Collaboration

Former theory did not account for biological drivers.





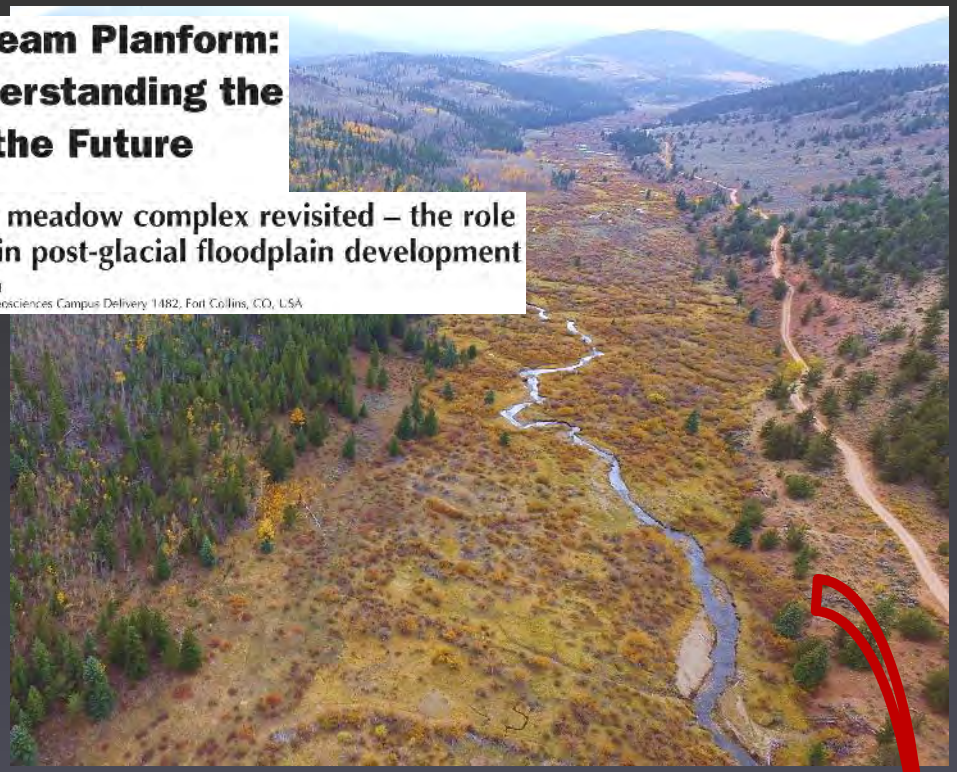


Biotic Drivers of Stream Planform: Implications for Understanding the Past and Restoring the Future

LINA E. POLVI AND ELLEN WOHL

The beaver meadow complex revisited – the role of beavers in post-glacial floodplain development

Lina E. Polvi* and Ellen Wohl
Colorado State University, Geosciences Campus Delivery 1482, Fort Collins, CO, USA

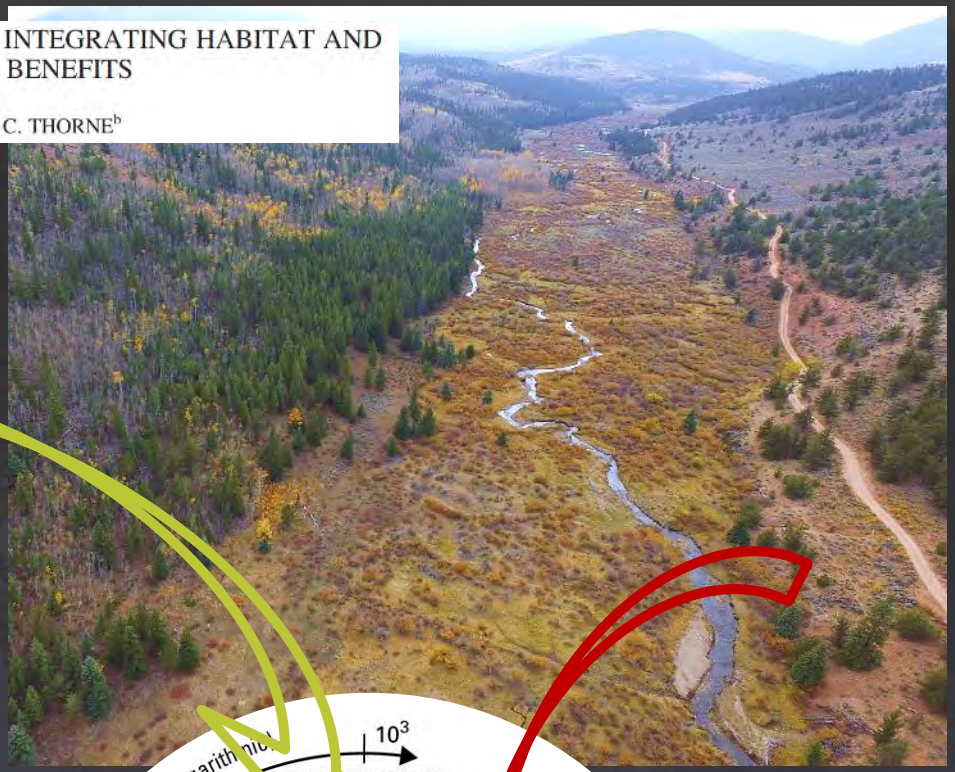


Time line		Holocene conditions		Probable channel planform			
Years ago	Climate	Beaver population	Likely beaver-meadow complex vegetation type	Braided	Single-thread meandering	Sinuous anabranching	Incised single thread
10,000	Postglacial warming	Unknown, but likely established after braided channel was colonized by vegetation	Sparse				
9000							
8000			Abundant/riparian				
7000							
6000	Altithermal: warmer and drier		Sparse/xeric upland; beaver maintained wetland vegetation				
5000							
4000		Abundant	Abundant/riparian				
3000							
2000							
1000							
800-1000							
600-800							
400-600							
200-400	Little Ice Age	Sharp decline	Possible riparian decrease				
0 0-200		Slight rebound followed by decrease	Abundant/riparian				

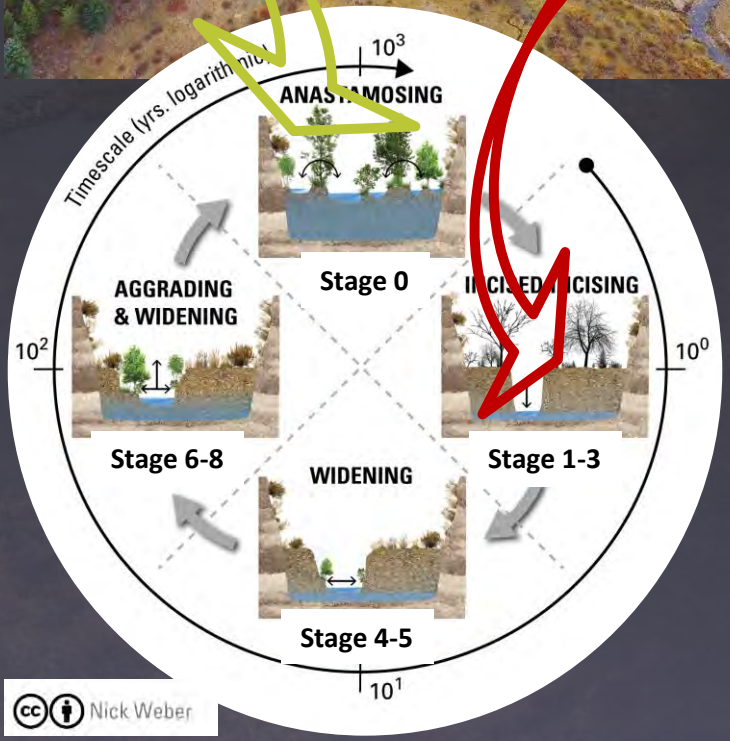
Polvi and Wohl. 2013. Biotic Drivers of Stream Planform.
BioScience 63: 439-452. doi: 10.1525/bio.2013.6.6

A STREAM EVOLUTION MODEL INTEGRATING HABITAT AND ECOSYSTEM BENEFITS

B. CLUER[a*] and C. THORNE[b]



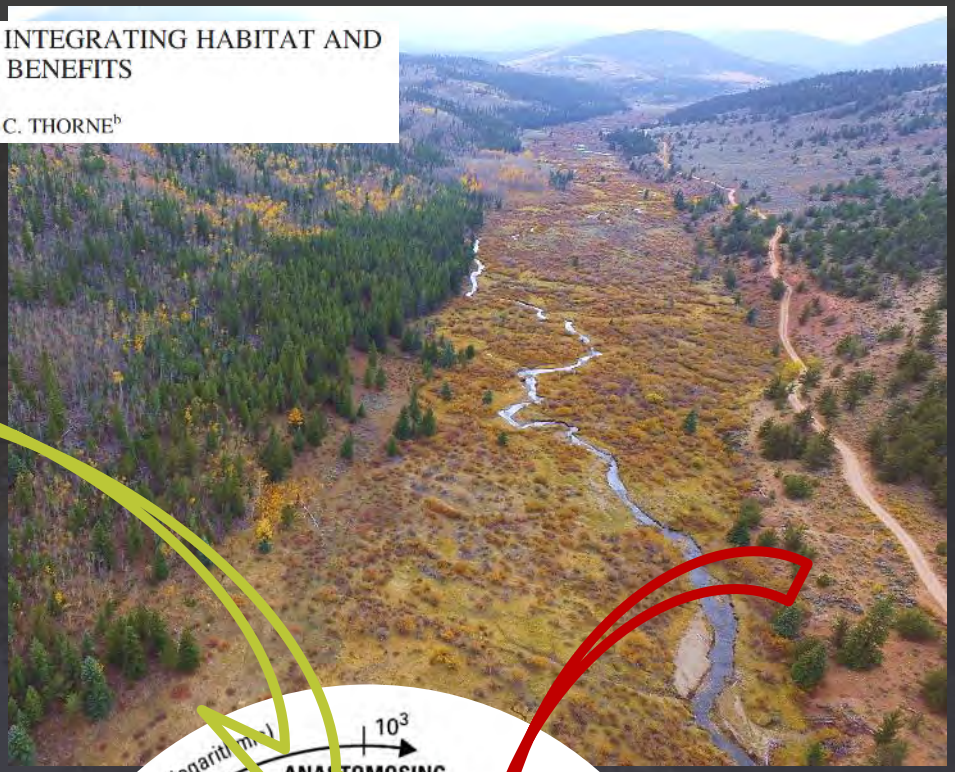
Biological drivers (beavers) make riverscapes wet.



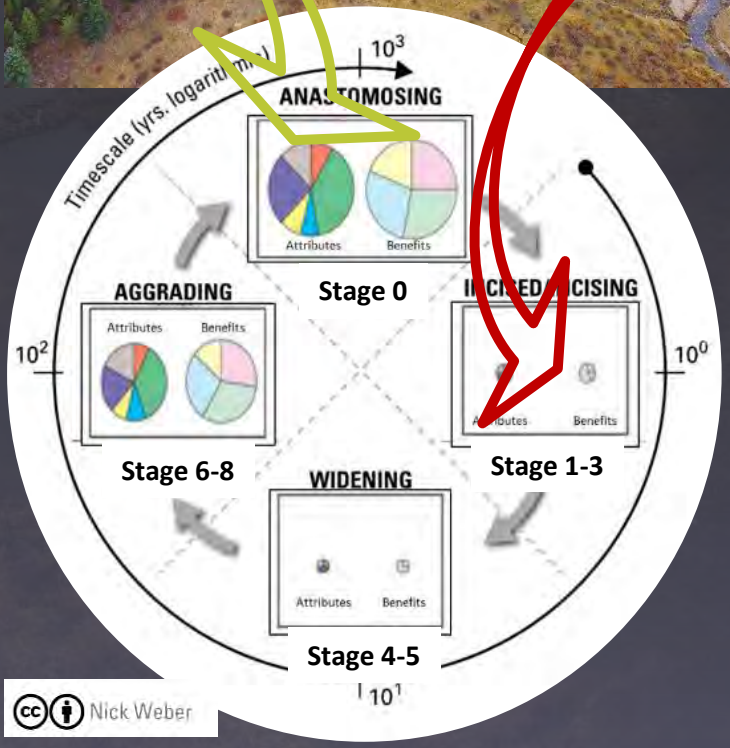
This is a simplified version of Cluer and Thorne's Stream Evolution Model drawn by Nick Weber.
Please check out the original paper:
Cluer and Thorne. 2013. A Stream Evolution Model Integrating Habitat and Ecosystem benefits. River Research and Applications. Doi: 10.1002/rra.261

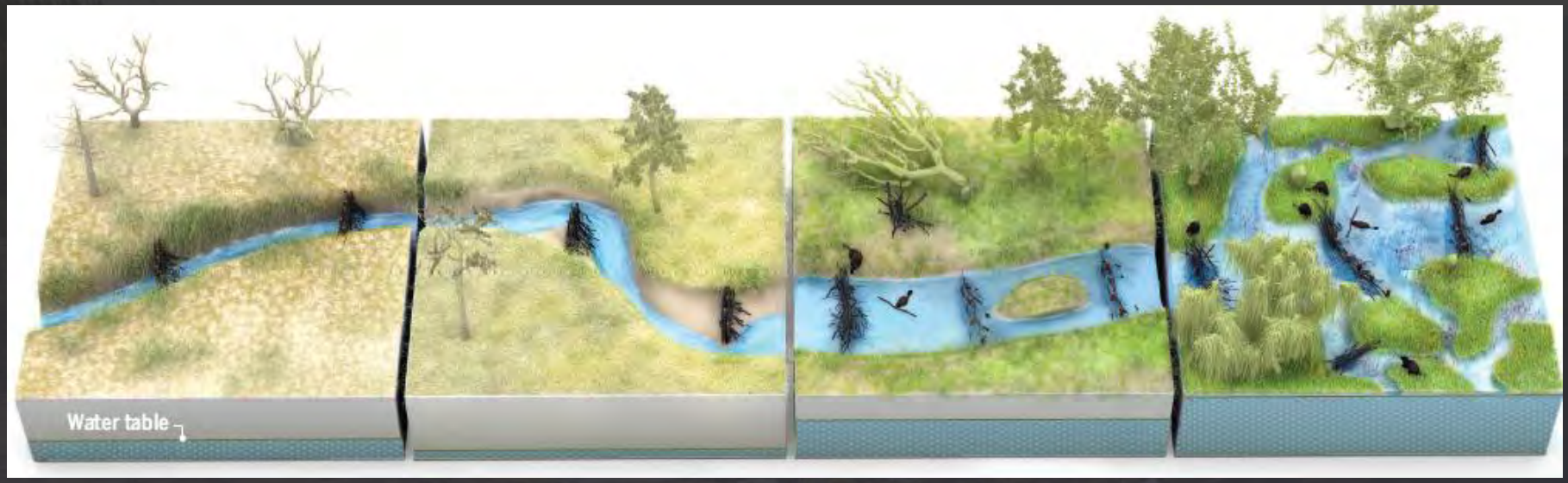
A STREAM EVOLUTION MODEL INTEGRATING HABITAT AND ECOSYSTEM BENEFITS

B. CLUER[a*] and C. THORNE[b]

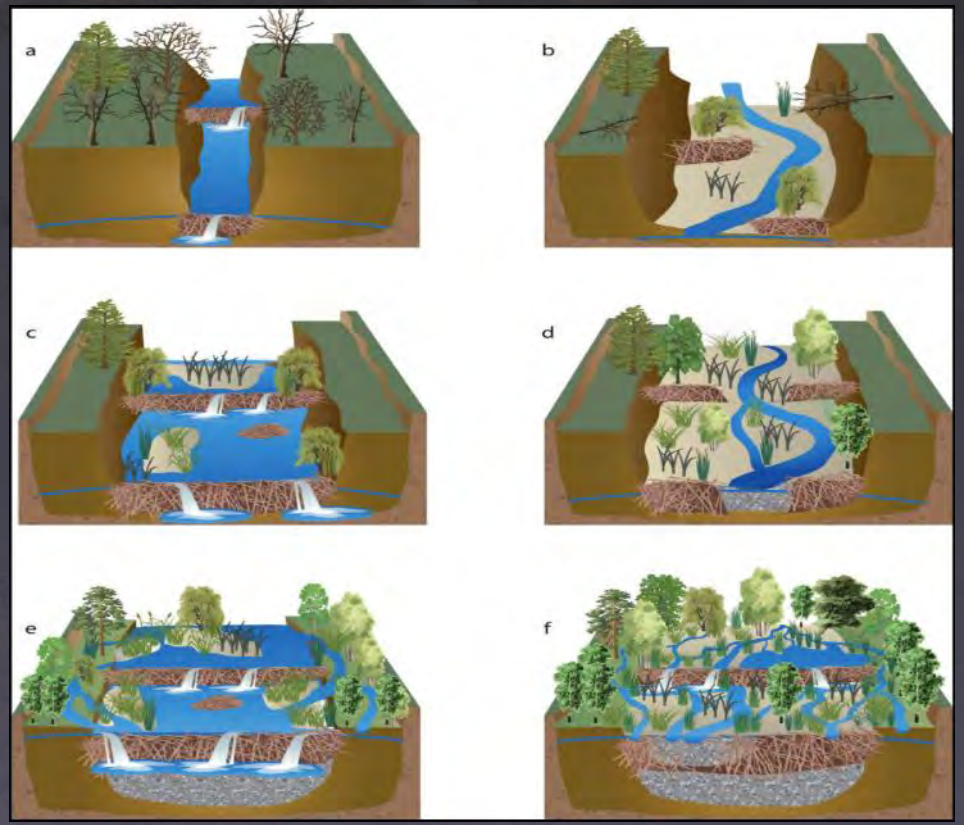


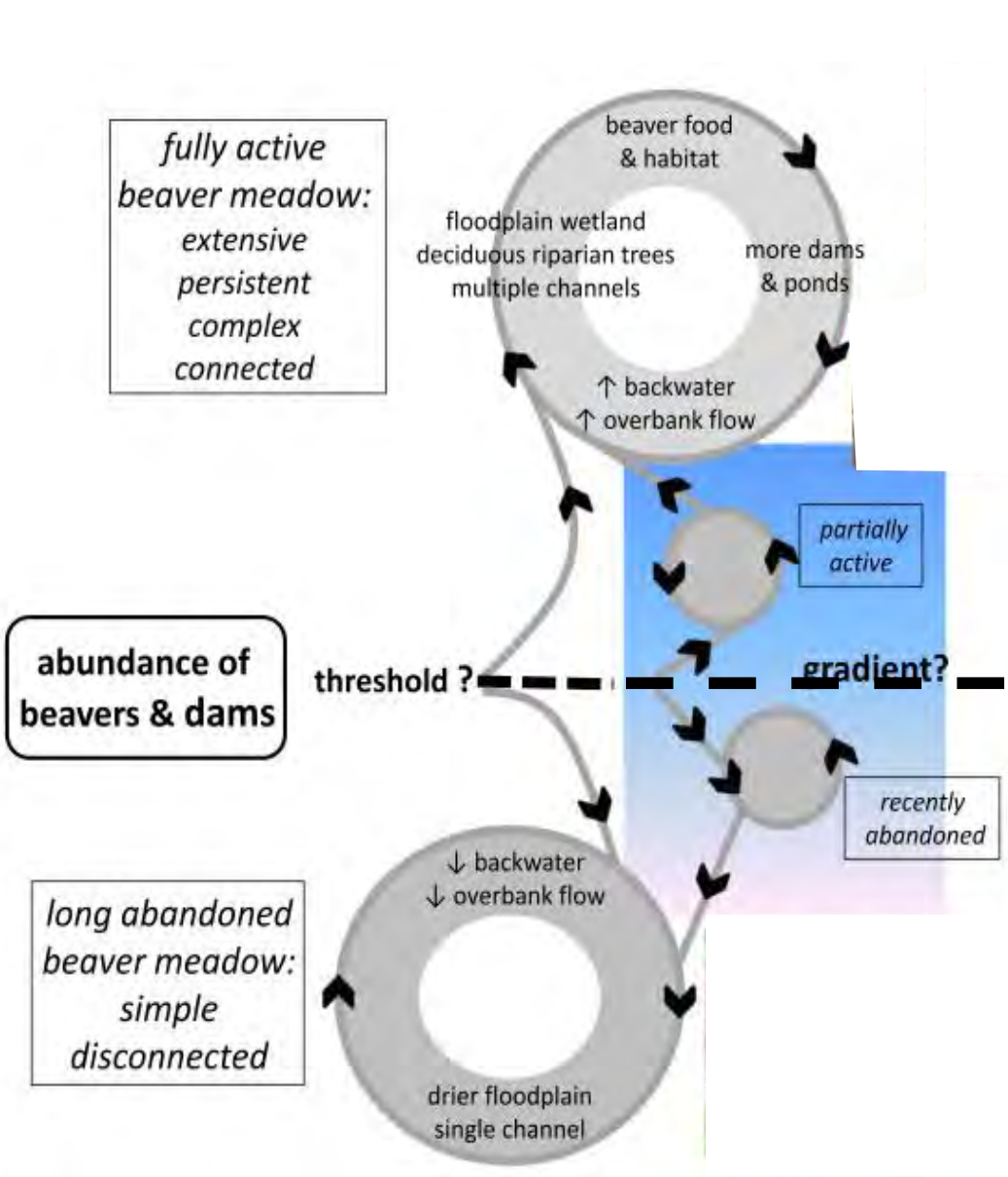
Wetland riverscapes (Beaver complexes) perform more ecosystem services.



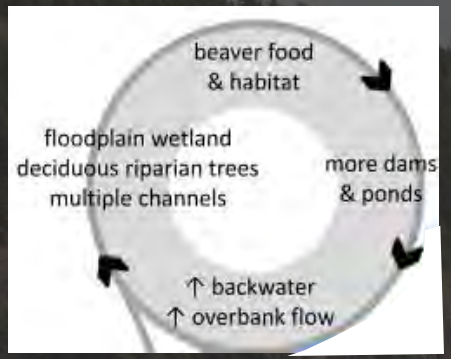


From Goldfarb (2018) Science: http://science.sciencemag.org/content/360/6393/1058





Laurel and Wohl (2018) The persistence of beaver-induced geomorphic heterogeneity and organic carbon stock in river corridors. Earth Surf. Process. Landforms. DOI: 10.1002/esp.4486


beaver food
& habitat
more dams
& ponds
↑ backwater
↑ overbank flow
floodplain wetland
deciduous riparian trees
multiple channels


beaver

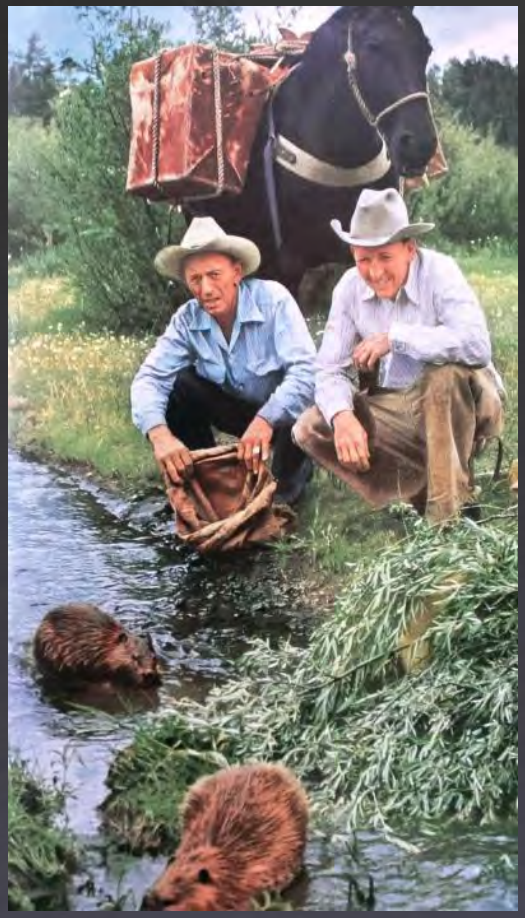

beaver dams
& channels


vegetation
& wood


ponds &
wetland


D'OH!


beaver
beaver dams & channels
vegetation & wood
ponds & wetland
Reintroduction



Some Historic Relocation Efforts

Location	Dates	Study Lead	# released	# sites	dam building?
California	1923 to 1944	CF&G/USFS/	234	52	Not reported
California	1945 to 1949	CF&G/USFS	974	222	Not reported
Washington	1930s	Edwards	76	40	Yes
North Dakota	1936	Saugstad	A few pair	Sheyenne River	Yes
Idaho	1948	Heter	76	Noreturn	Yes
North Dakota	1943 to 1951	Hibbard	466	43c	Yes
Arizona	1950s	Borneman	?	?	Yes
Colorado	1950s	Denny	?	?	Yes
Washington	1950s	Schoen	33	7	Yes

Some More Recent Relocation Efforts

Location	Dates	Study Lead	# released	# sites	dam building sites
Colorado	1985—present	Tippie	Hundreds	?	many
Idaho	1988--2003	Pence	200	many	many
Washington	1994—present	Desautel	193	45	20
Wyoming	1994--1999	McKinstry	234	14	14
Washington	2008--2017	Woodruff	400	66	45
Oregon	2009	Jackson/Petro	37	13	limited
Washington	2010--present	Parrish/Cannon	70	14	5
Washington	2011--2015	Meyer/Babik	130	38	12
Oregon	2011	Petro	38	9	4
Utah	2012	Christensen	9	2	2
Washington	2012--present	Marsh	20	5	3
Washington	2014	Alves/Dittbrenner	84	19	13

METHOW BEAVER PROJECT

Storing water for the future-one beaver at a time

www.methowsalmon.org

Credit to Kent Woodruff and Alexa Whipple, former and current directors of the Methow Beaver Project. Photos and slides from presentation at BeaverCon2020.


beaver
beaver dams & channels
vegetation & wood
ponds & wetland

Mimicry


beaver
beaver dams & channels
vegetation & wood
ponds & wetland


Mimic → Promote → Sustain
Water table

Riparian vegetation

Partnering with Beaver to Restore Wetland

← Thanks again to Mike Digout for photos and video. Check out his site on Facebook