WF4313/6413-Fisheries Management

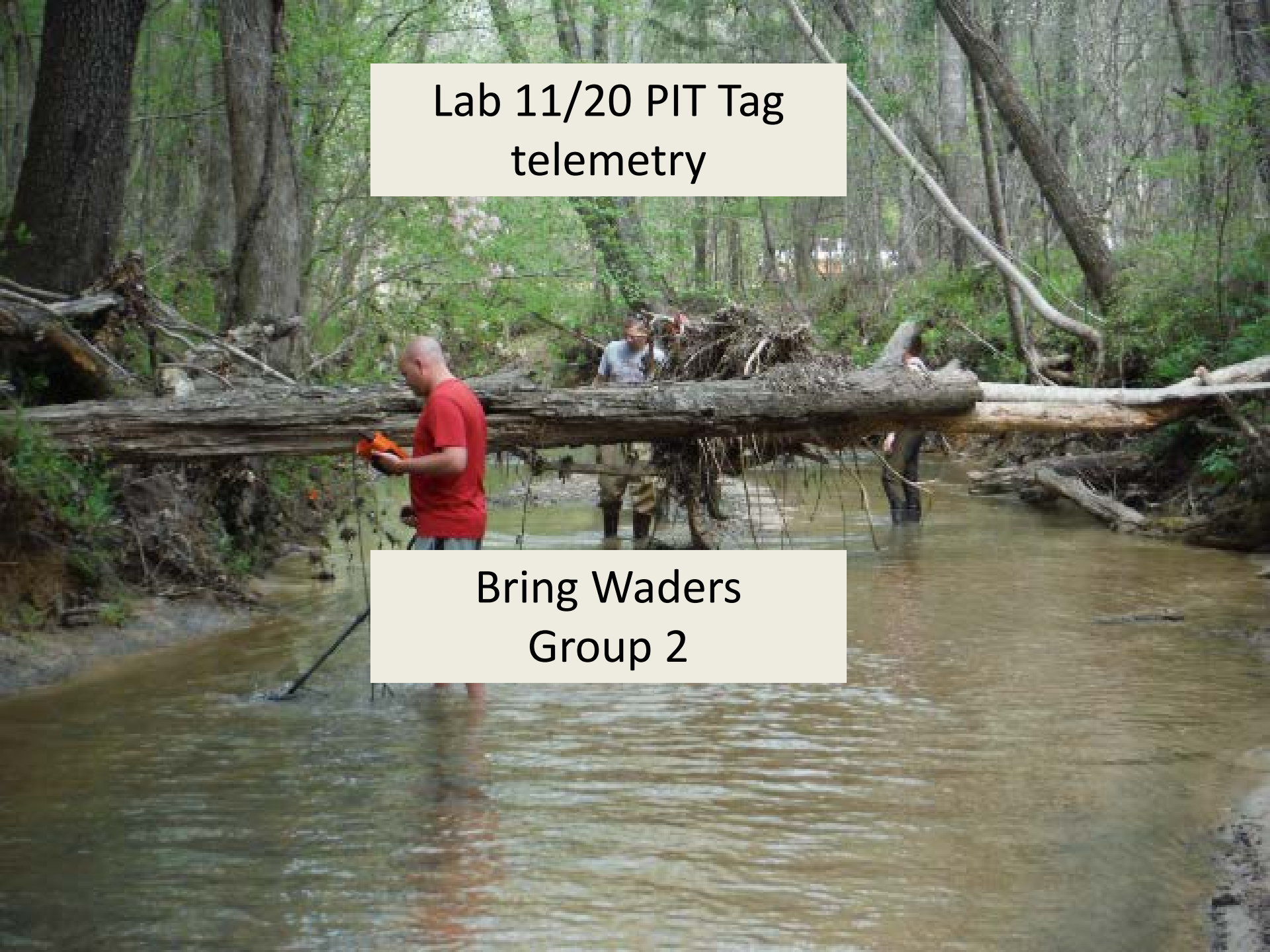
Class 18

Announcements

Revised Schedule**

- ~~October 30 = Group 1 @ Panther Creek~~
- ~~November 6th = Group 2 we'll do something~~
- November 13th = NO LAB… ☹
- Exam II = November 14th
- November 20th = Group 1 will do what group 2 did
- November 27th & December 4th ???

** Contingent on van availability


Lab 11/20 PIT Tag telemetry
Bring Waders
Group 2

Tonight @ 5pm TH118

Pizza and Olives

Interested in chasing more lamprey? Opportunities to assist on an undergraduate research project. Saturday November 17th

Lab Results…? Holy crap…

15 unique tags!

Row Labels	P1	P2	P3	P4	P5	P6	Grand Total
384.0A0301E963			1		1		2
384.0A0301E978	1		1	1	1	1	5
384.0A0301E97D			1				1
384.0A0301E986			1				1
384.0A0301E992		1				1	2
384.0A0301E998					1		1
384.0A0301E999		1	1				2
384.0A0301E99B		1	1	1		1	4
384.0A0301E9A2		1					1
384.0A0301E9A7	1		1				2
384.0A0301E9AF	1						1
384.0A0301E9B0	1				1		2
384.0A0301E9B8	1	1		1	1		4
384.0A0301E9BC	1	1		1			3
384.0A0301E9C0		1				1	2
Count	**6**	**7**	**7**	**4**	**5**	**4**	

Row Labels	P1	P2	P3	P4	P5	P6	Grand Total	Pr(Detect)
384.0A0301E963			1		1		2	0.13
384.0A0301E978	1		1	1	1	1	5	0.33
384.0A0301E97D			1				1	0.07
384.0A0301E986			1				1	0.07
384.0A0301E992						1	2	0.13
384.0A0301E998					1		1	0.07
384.0A0301E999			1	1			2	0.13
384.0A0301E99B			1	1	1	1	4	0.27
384.0A0301E9A2			1				1	0.07
384.0A0301E9A7	1		1				2	0.13
384.0A0301E9AF	1						1	0.07
384.0A0301E9B0	1				1		2	0.13
384.0A0301E9B8	1	1		1	1		4	0.27
384.0A0301E9BC	1	1		1			3	0.20
384.0A0301E9C0		1				1	2	0.13
Count	**6**	**7**	**7**	**4**	**5**	**4**		
Pr(detect)	0.4	0.47	0.47	0.27	0.33	0.27		**Pr(Missing any)**
Pr(no detect)	0.60	0.53	0.53	0.73	0.67	0.73		**0.06**

$N_{tagged}=N_{captured}/Pr(capture)$

$N_{tagged}=15/(1-0.06) = 15.99$

Likely we missed 1!

Product of Pr(no detect)
Probablility of capture over all 6 passes is 1-Pr(Missing any)


WHERE WE LEFT OFF

Challenges to biodiversity

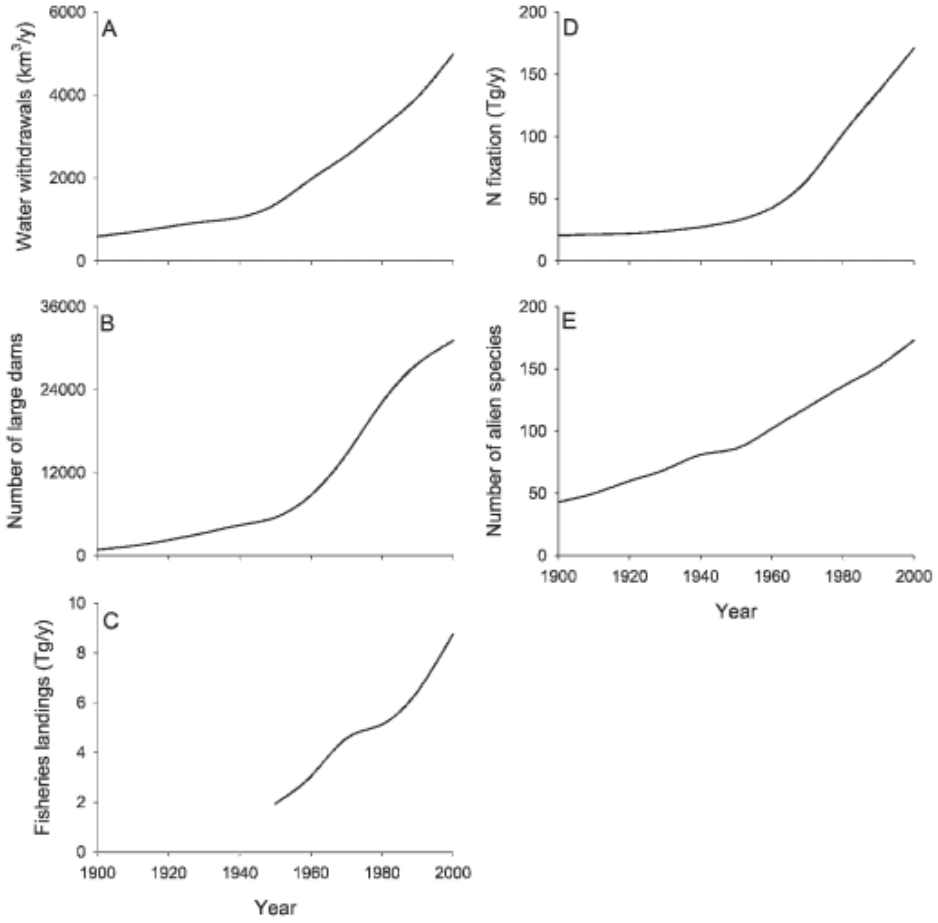
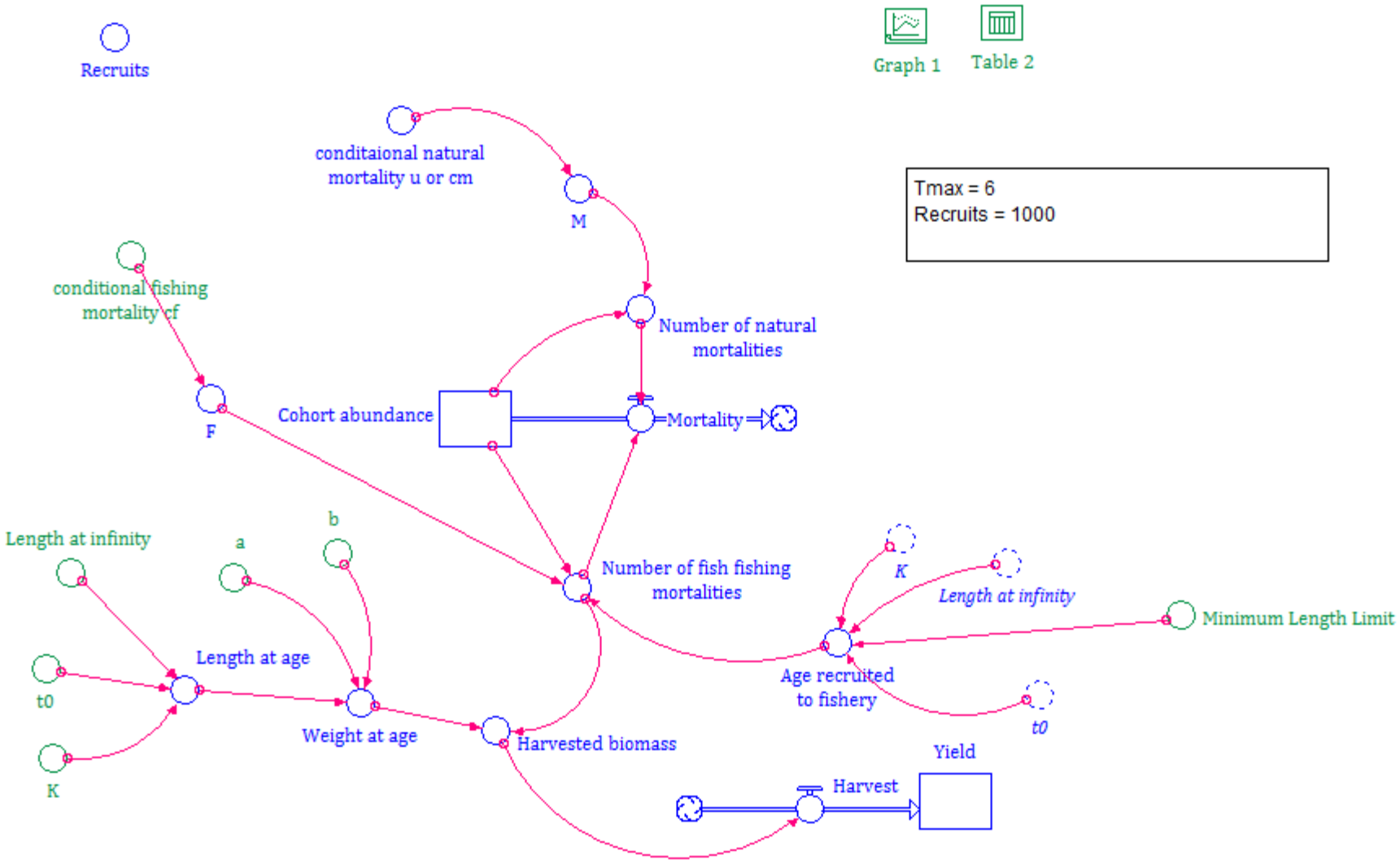


FIG. 1. Five examples of rising human pressures on the world's freshwater ecosystems. A.—Global water withdrawals (after Gleick 1993). B.—Number of large (>15 m high) dams (International Commission on Large Dams 2008). C.—Fisheries landings from inland waters (Allan et al. 2005a). D.—Global inputs of anthropogenically fixed N. Input from all natural sources is ~110 Tg/y (Vitousek 1994, Galloway et al. 2008). E.—Number of known alien species in the Laurentian Great Lakes (Ricciardi 2006).

Strayer, D. L., and D. Dudgeon. 2010. Freshwater biodiversity conservation: recent progress and future challenges.

Where is the habitat?



Fish Habitat

Elements of aquatic habitat

1. Amount
2. Chemical
   - Dissolved oxygen, pH,salinity
3. Physical
   - Sediment, turbidity, substrate
4. Biological
   - Macrophytes, Woody debris

Elements of aquatic habitat management

1. Restoration
2. Conservation
3. Mitigation

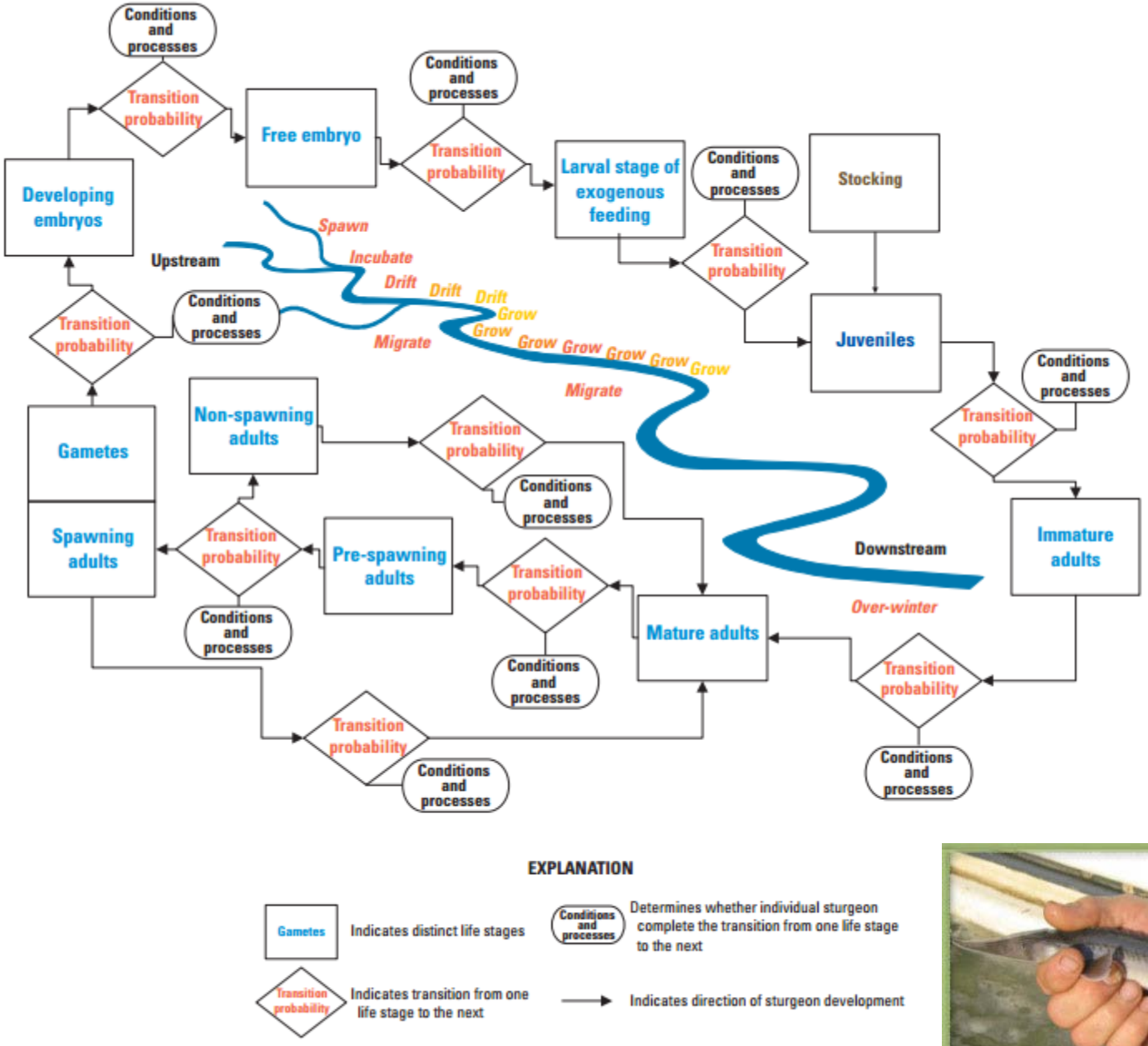


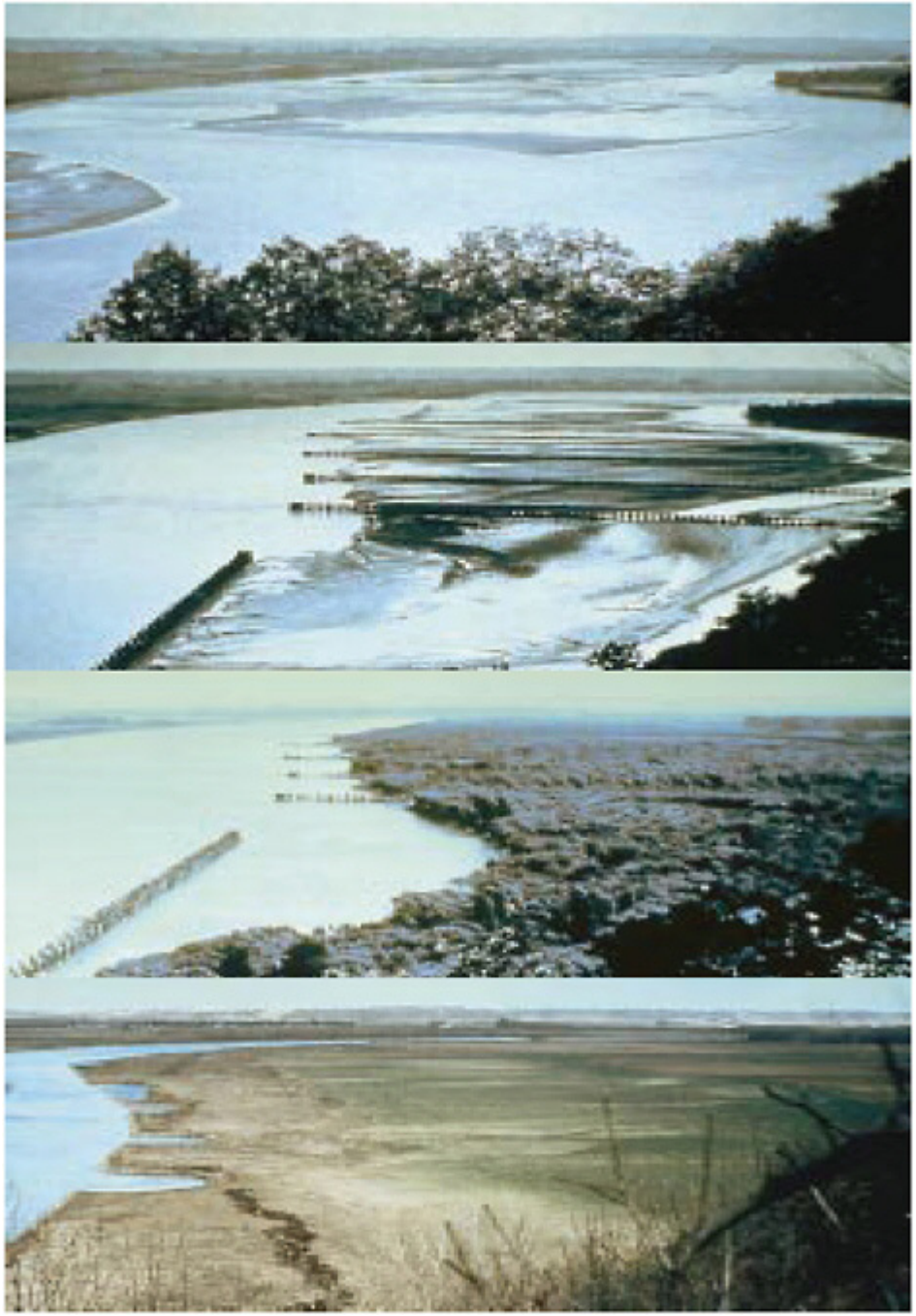
Figure 2. Conceptual model of *Scaphirhynchus* sturgeon life history.

HABITAT MANAGEMENT

Lo. Mo. River @ Yankton

Channelization of the river

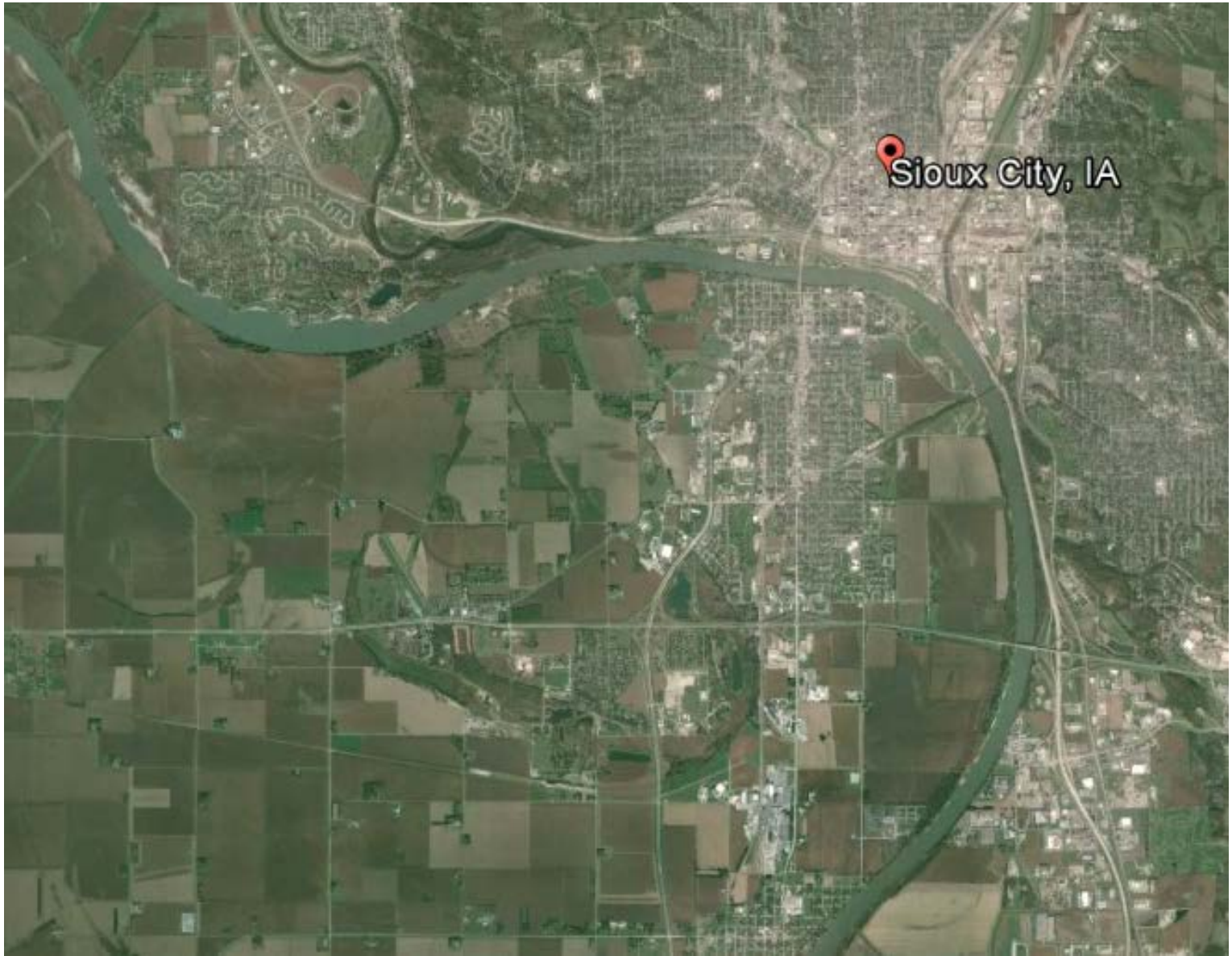
Indian Cave Bend on the Missouri River near river mile 517, about 18 miles upstream from Rulo, Nebraska. They illustrate the river before (1934; top photo) and after (1935, 1946, and 1977) the construction of brush dikes that narrowed and channelized the river.



https://www.nap.edu/read/13019/chapter/4#32

Straightening Meanders

Lo. Mo. River @ Sioux City



Maintaining channels

Training outer bends

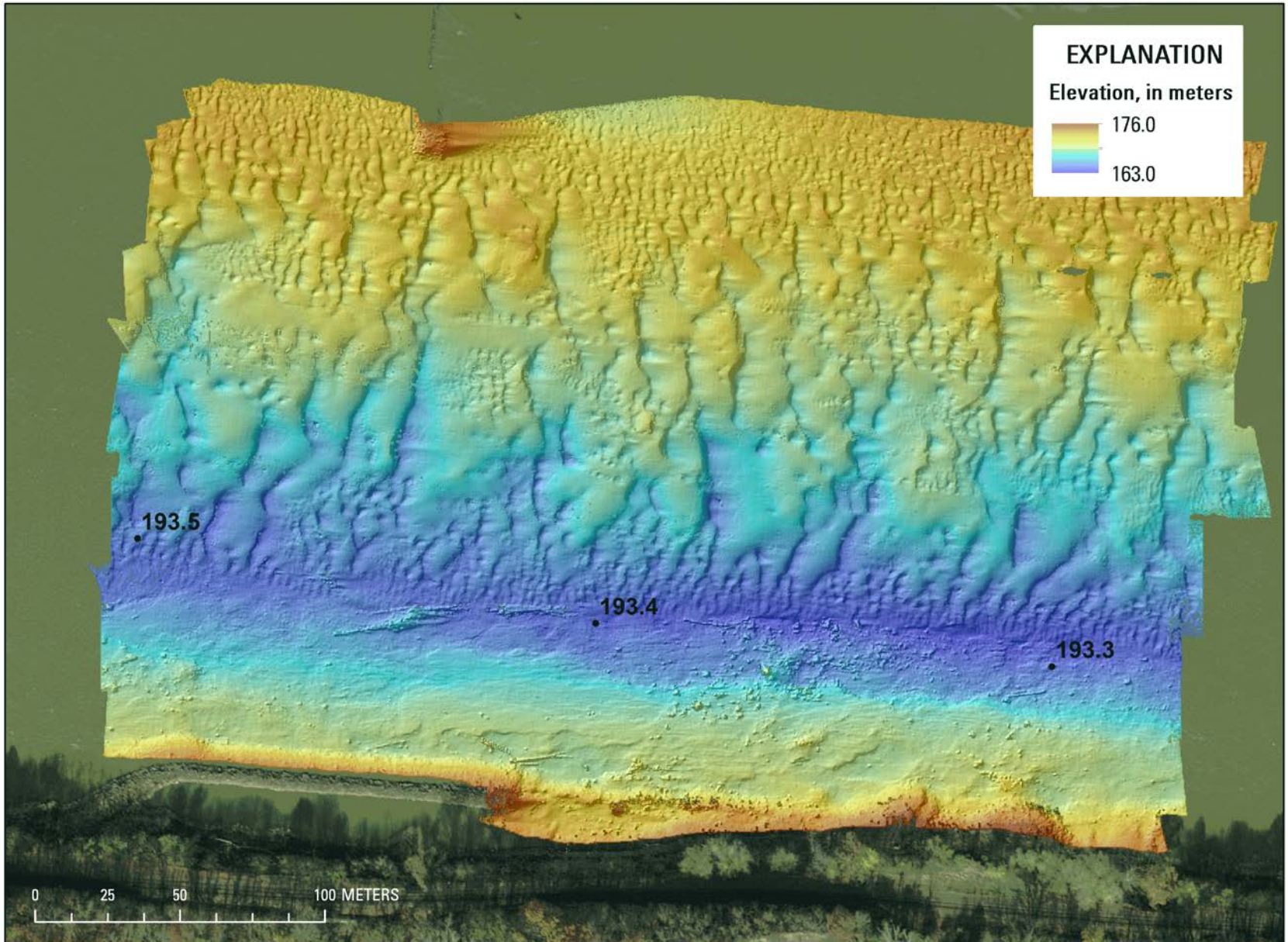
Flood control

Effects of channelization

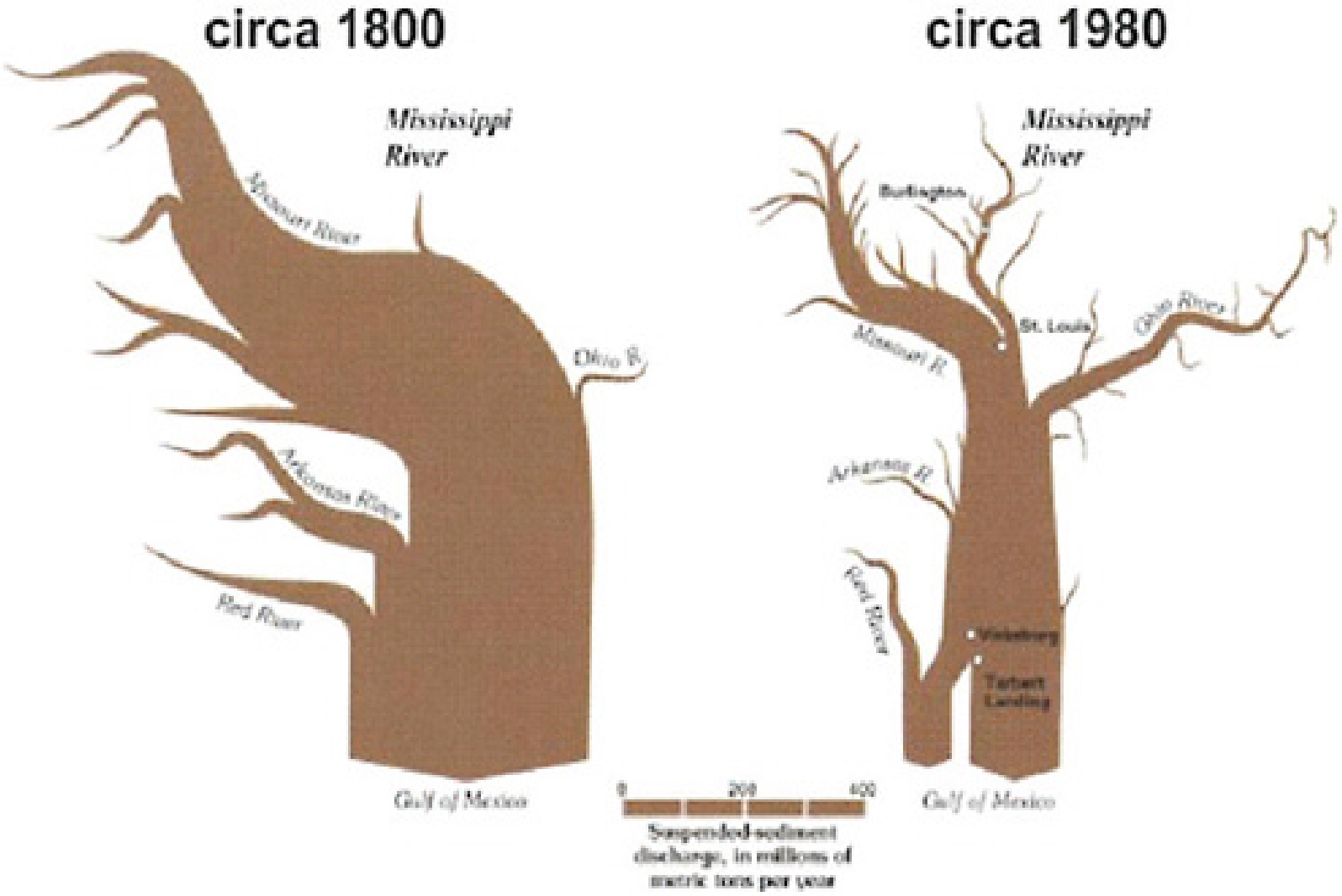
1. Chemical
   - Contaminants
2. Physical
   - Sediment, turbidity, substrate, flow
3. Biological
   - Energetic demand, life history habitats, prey communities

Elevated Flows

Dynamic Habitat



Sediment delivery



https://www.nap.edu/read/13019/chapter/4#37

Upstream dams allow sediment to settle out & increase water clarity

Emergent Sandbar Habitat

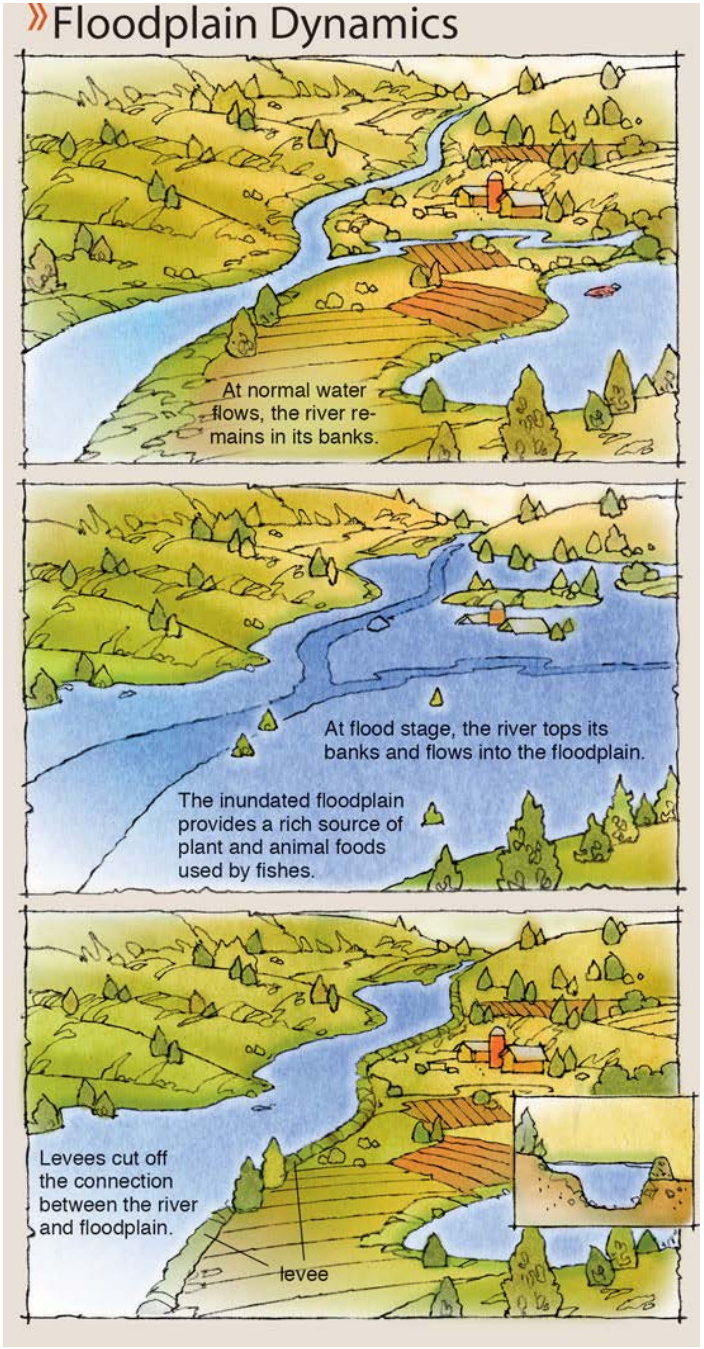
Shared habitat

Restoration

Floodplain connectivity

Floodplain dynamics

- Nutrient spiraling
- Dike notching

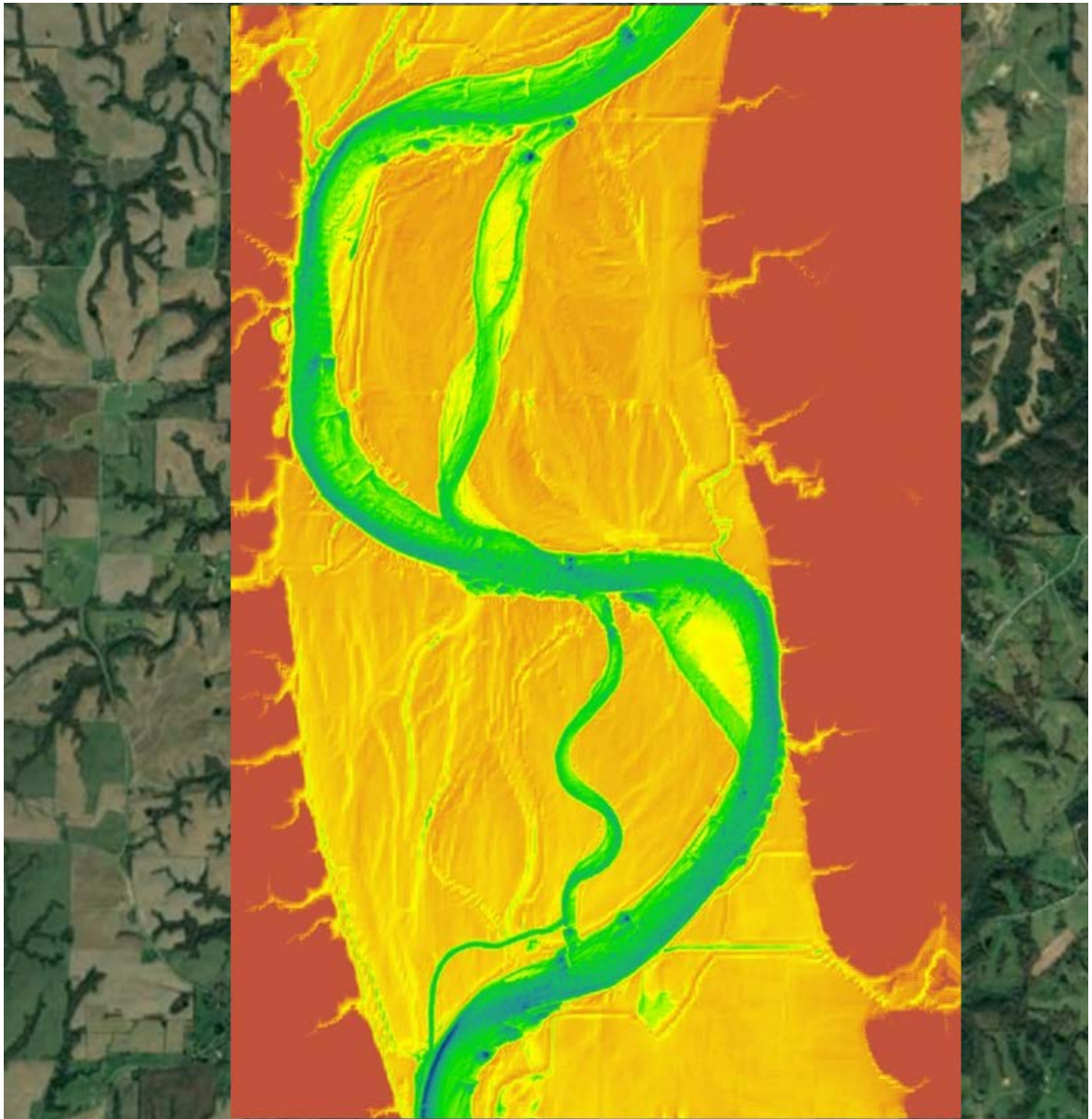


http://www.in-fisherman.com/catfish/catfish-habitats/

Floodplain connectivity

Habitat Restoration

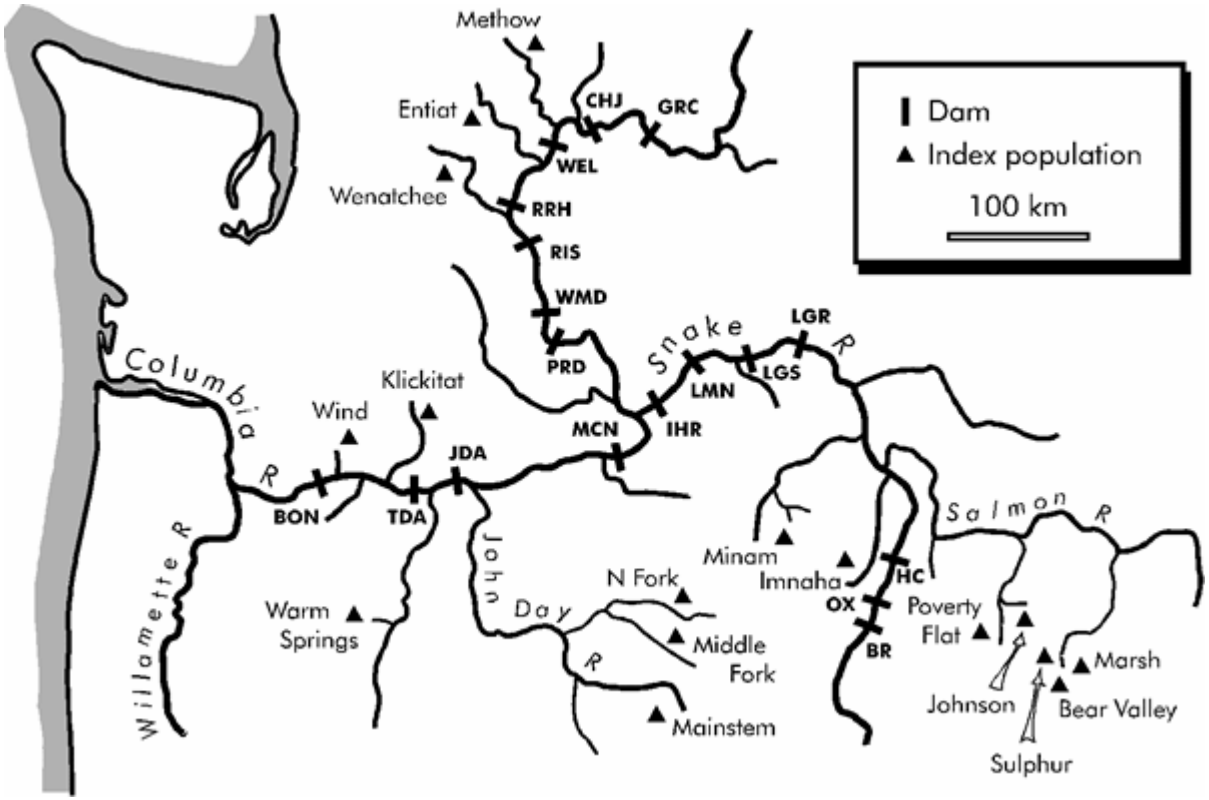
Habitat Restoration



RESTORATION, CONSERVATION, & MITIGATION EXAMPLE

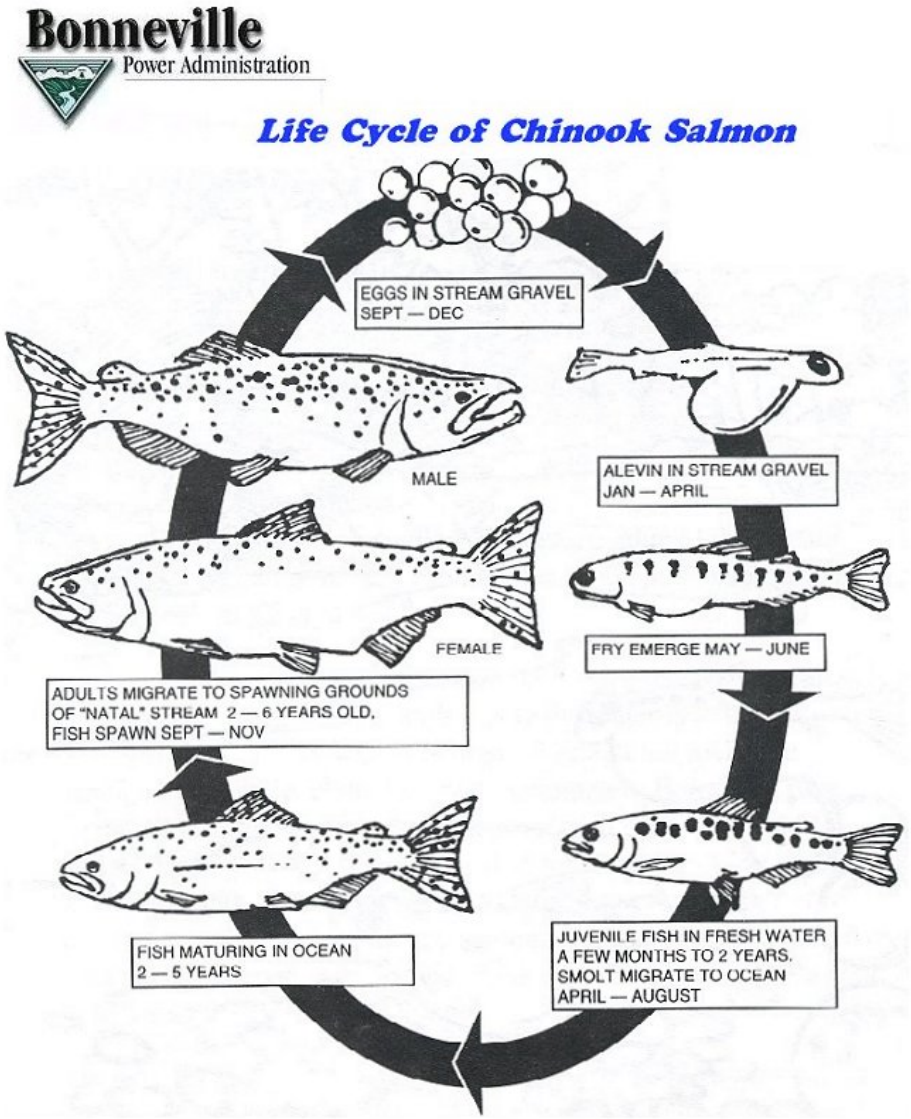
Restoration, Conservation, & Mitigation Example

- Supplement population for lost habitat
- Example: Dams & anadromous fish



Columbia Basin

Anadromous life history



Habitat restoration

- Watershed improvements (land uses, strategic land acquisitions)
- Improve riparian corridors (Nutrients, sedimentation, thermal)
- Improve stream connectivity (stream reconnection, fish ladders, physical transport)

Pahsimeroi River

Land acquisition

Stream reconnection