

 UNIVERSITY OF MINNESOTA EXTENSION

MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH

# Big Woods, Big Rivers

## MINNESOTA MASTER NATURALIST PROGRAM

© 2020 Regents of the University of Minnesota. All rights reserved.


1

# LESSON SEVEN: BIGMOUTH BUFFALO, NORTHERN LEOPARDS, AND WILD RICE

The plants and animals of the Big Woods' waters.

IMAGE BY DANIELLE QUAST, UNIVERSITY OF MINNESOTA AFNR/PWCE



 UNIVERSITY OF MINNESOTA EXTENSION

© 2020 Regents of the University of Minnesota. All rights reserved.

2

## OUTLINE

- Energy flow of lakes and rivers
- River characteristics that affect energy flow
- Water Quality
- Aquatic Life, Habitats, Adaptations

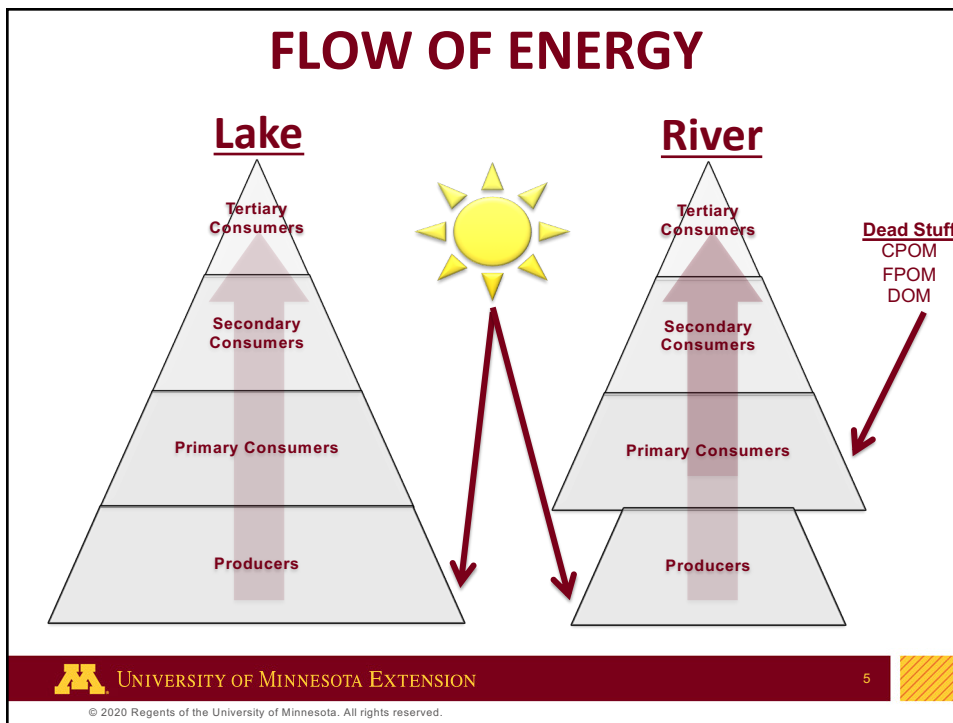


3

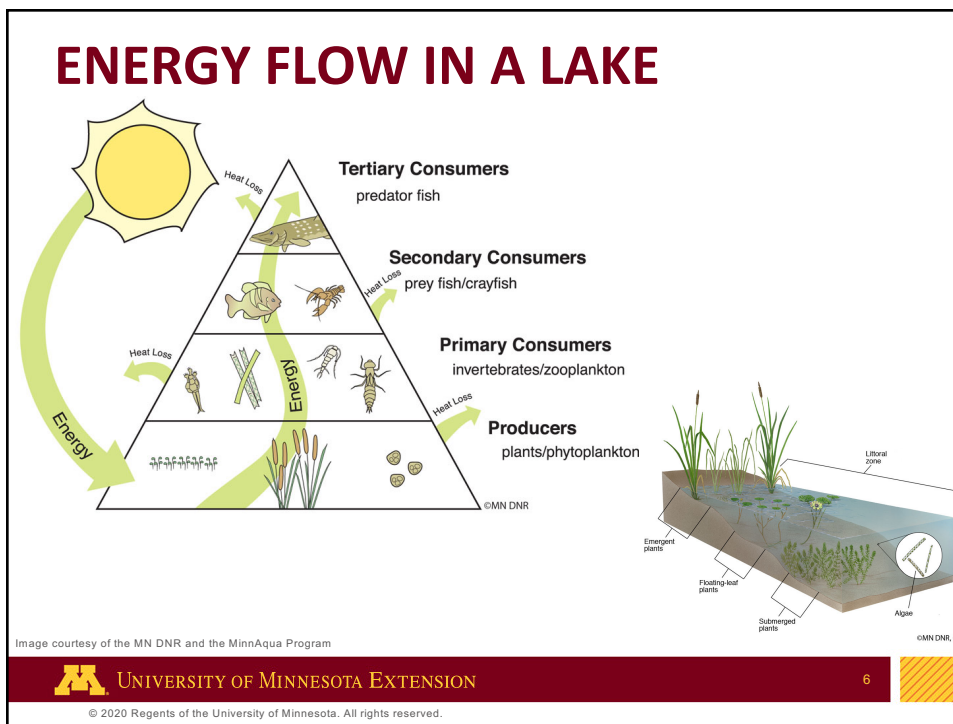
## ENERGY FLOW OF LAKES AND RIVERS CAN BE VERY DIFFERENT



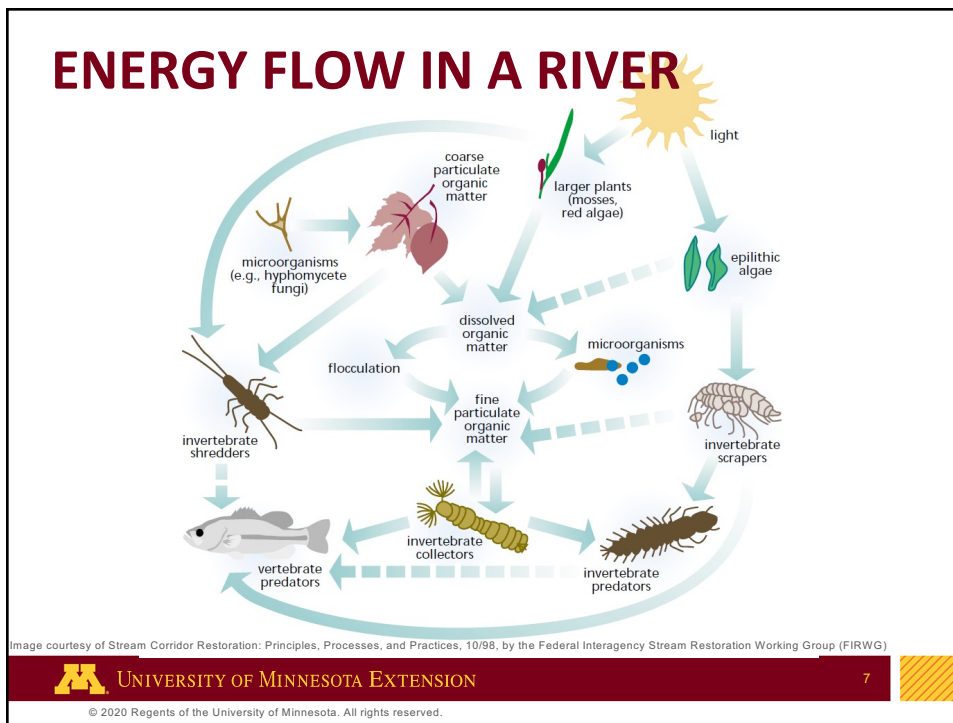
4



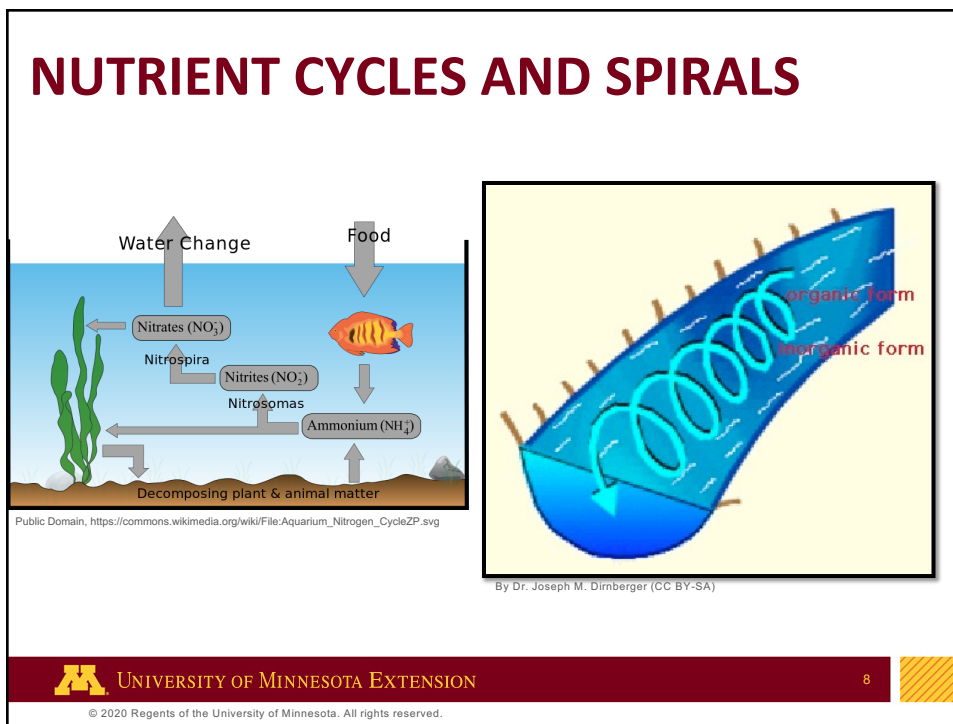
5



6



7



8

# RIVER CONTINUUM CONCEPT

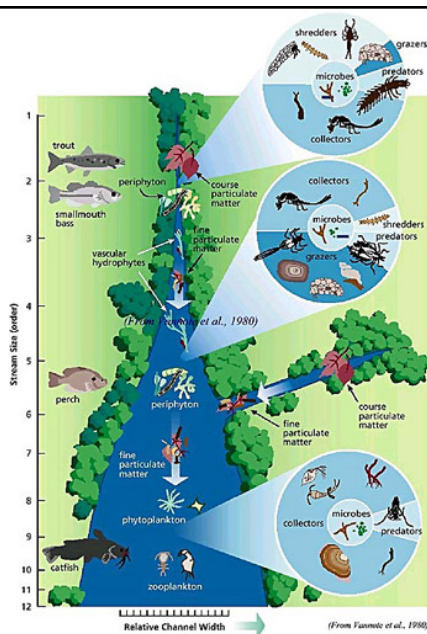
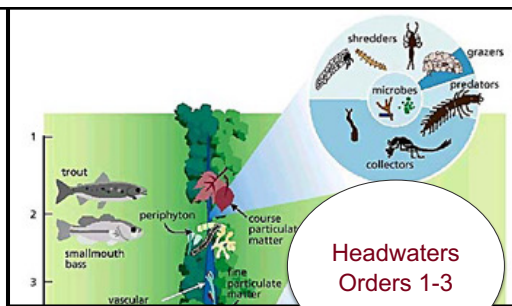


Image courtesy of Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FIRWG)

# HEADWATER STREAM

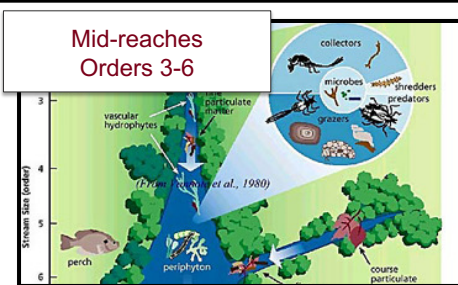


- What is the gradient and substrate like?
- Is the stream sunlight limited?
- What is the primary source of energy?
- What's the water temperature?
- What kind of fish would live here?



Image courtesy of Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FIRWG)

# MID-REACH STREAM



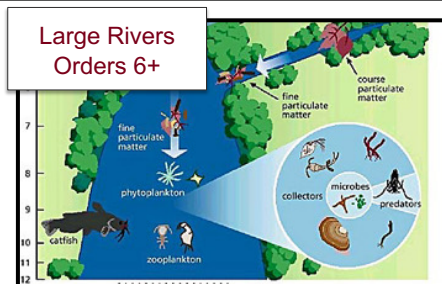
- What is the gradient and substrate like?
- Is the stream sunlight limited?
- What do insects eat?
- What's the water temperature?
- What do insects feed on?



Image courtesy of Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FIRWG)

11

# LARGE STREAM



- What is the gradient and substrate like?
- Is sunlight limited?
- What is the primary source of energy?
- What type of fish live here?
- How does flooding impact energy flow?



Image courtesy of Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FIRWG)

12

## AQUATIC LIFE

- The Self-Directed
  - Fish
  - Mammals
  - Birds
  - Amphibians/Reptiles
  - Larger Zooplankton/Insects
- Drifters
  - Plankton, Algae, Bacteria
  - Detritus (Dead Stuff)
- Bottom Dwellers
  - Benthos
  - Plants
  - Bacteria and Fungi



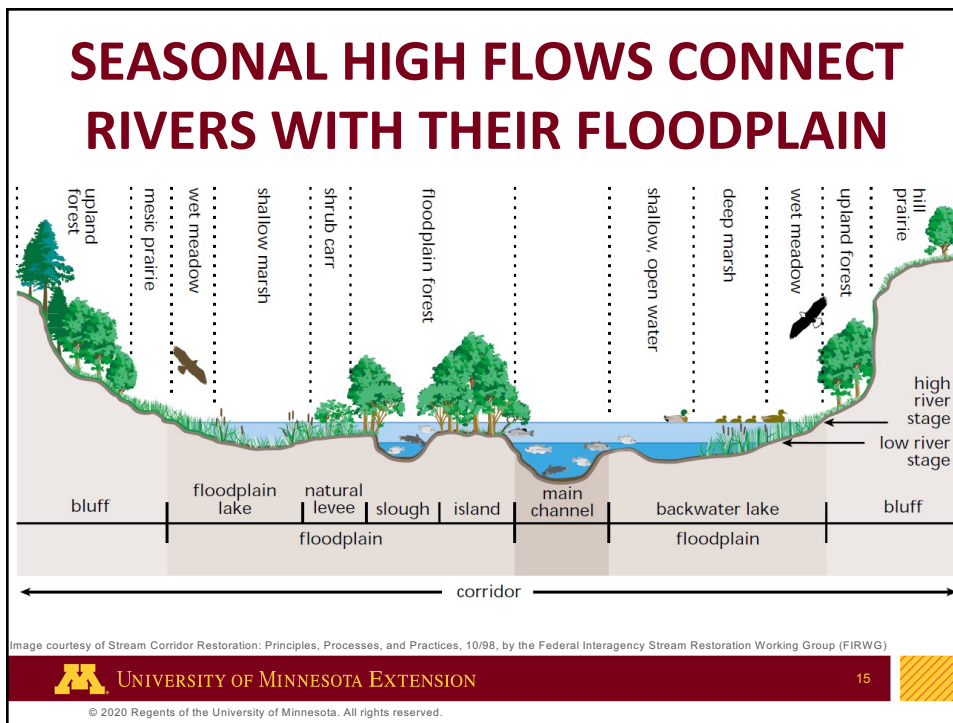
13

## HOW DO HIGH FLOWS AND FLOODING EFFECT THE ENERGY FLOW OF RIVERS?

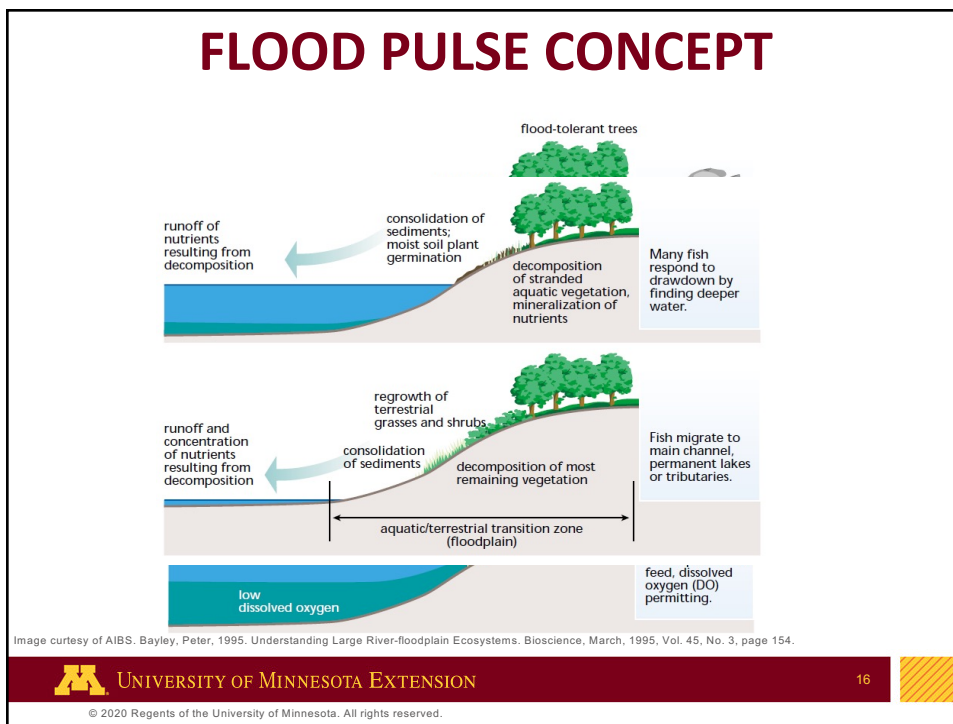


14





15



16



## WATER QUALITY IS AN IMPORTANT FACTOR TO DETERMINING WHAT CAN LIVE IN A LAKE/STREAM.



UNIVERSITY OF MINNESOTA EXTENSION

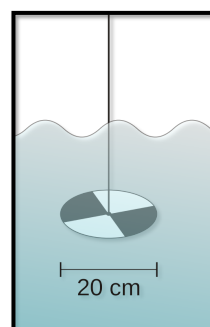
17

© 2020 Regents of the University of Minnesota. All rights reserved.

17

## WATER QUALITY PARAMETERS

- pH
- Water Clarity (color and turbidity)
- Temperature
- Dissolved Oxygen
- Nutrients (P and N)
- Pollutants (PCBs, Metals, etc)

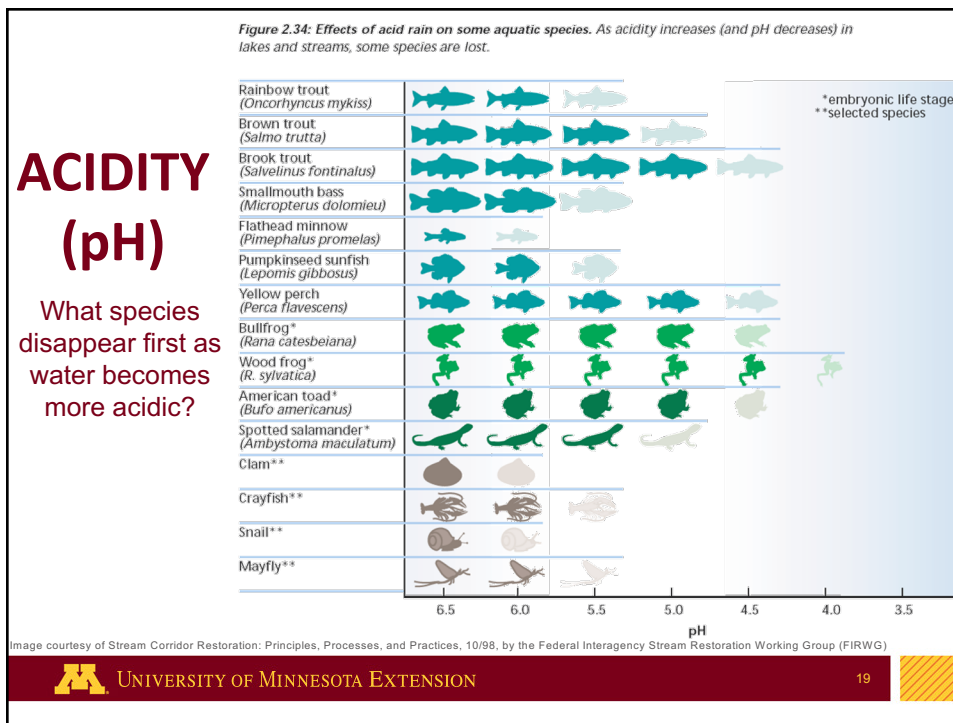


UNIVERSITY OF MINNESOTA EXTENSION

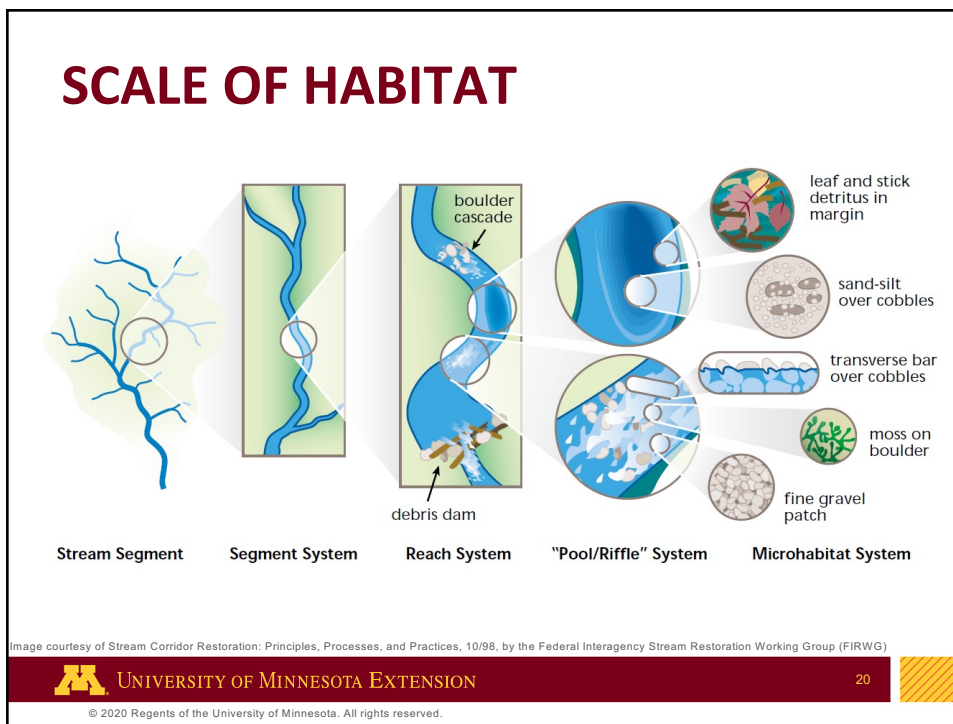
18

© 2020 Regents of the University of Minnesota. All rights reserved.

18



19



20

## WHAT ARE SOME LAKE HABITATS/ZONES? WHAT MIGHT YOU FIND LIVING THERE?

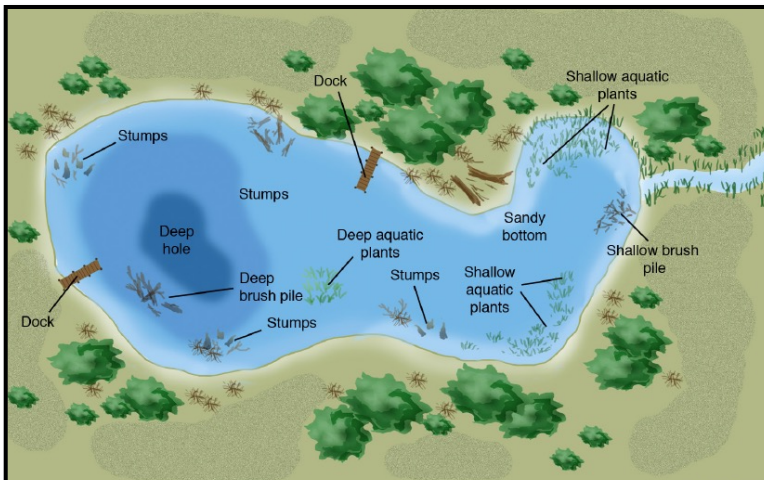


Image courtesy of MN DNR, MinnAqua Program

21

## WHAT ARE SOME RIVER HABITATS? WHAT MIGHT YOU FIND LIVING THERE?

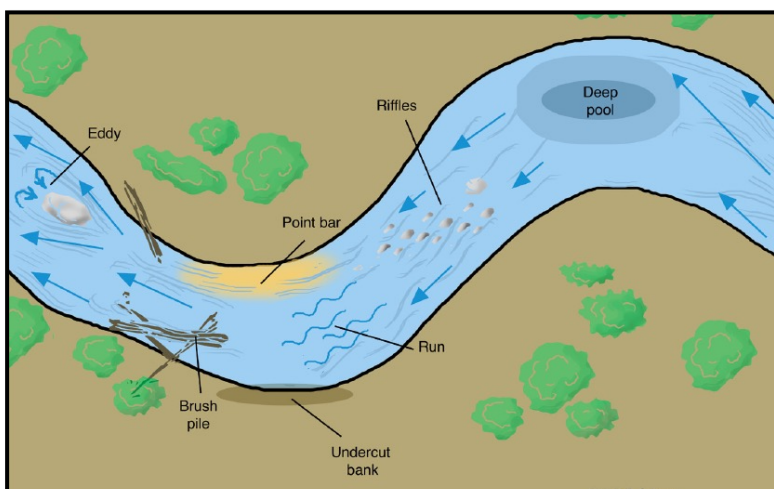
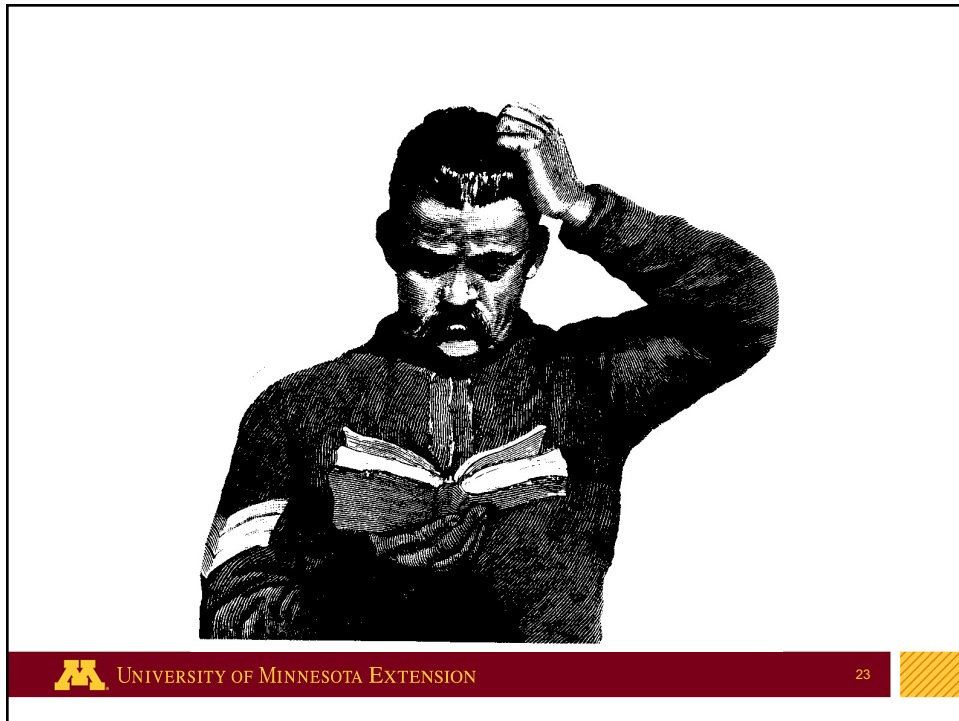


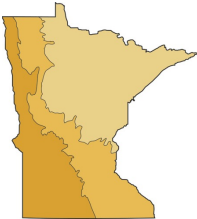
Image courtesy of MN DNR, MinnAqua Program

22



23

Aquatic plants and animals are adapted to survive and prosper in the unique habitats and conditions of Minnesota's lakes and streams.



At the bottom of the slide content area is a dark red banner with the University of Minnesota Extension logo and text on the left, and a small yellow square with diagonal lines on the right.

24

# ACKNOWLEDGMENTS

Images used in this presentation were taken from multiple sources and we thank all of the people who gave us permission to use them.

UNIVERSITY OF MINNESOTA  
**EXTENSION**  
MINNESOTA MASTER NATURALIST



UNIVERSITY OF MINNESOTA EXTENSION

25

25



UNIVERSITY OF MINNESOTA EXTENSION

**Driven to Discover<sup>SM</sup>**

## Minnesota Master Naturalist Program

46352 State Highway 329, Morris MN 56267  
320-589-1711 or 888-241-4532  
[info@minnesotamasternaturalist.org](mailto:info@minnesotamasternaturalist.org)



© 2020 Regents of the University of Minnesota. All rights reserved.  
The University of Minnesota is an equal opportunity educator and employer. In accordance with the Americans with Disabilities Act, this PowerPoint is available in alternative formats upon request. Direct requests to 612-624-1222.

MAKING A DIFFERENCE IN MINNESOTA: ENVIRONMENT + FOOD & AGRICULTURE + COMMUNITIES + FAMILIES + YOUTH

26