

Postcards from Beaver World

Science Seminar
November 21, 2019

Jen Vanderhoof, Senior Ecologist
jennifer.vanderhoof@kingcounty.gov



King County

This work funded by King County Surface Water Management (SWM) fees.

Multiple Choice

Beavers have been known to...



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.**



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
- d. Build an uphill canal system with locks to access a favorite tree species.**



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
- d. Build an uphill canal system with locks to access a favorite tree species.
- e. **Ignore leaks and spillways that form on their dams.**



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
- d. Build an uphill canal system with locks to access a favorite tree species.
- e. Ignore leaks and spillways that form on their dams.
- f. **Attempt to dam speakers that played sounds of running water.**



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
- d. Build an uphill canal system with locks to access a favorite tree species.
- e. Ignore leaks and spillways that form on their dams.
- f. Attempt to dam speakers that played sounds of running water.
- g. All of the above.



Multiple Choice

Beavers have been known to:

- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
- d. Build an uphill canal system with locks to access a favorite tree species.
- e. Ignore leaks and spillways that form on their dams.
- f. Attempt to dam speakers that played sounds of running water.
- g. All of the above.



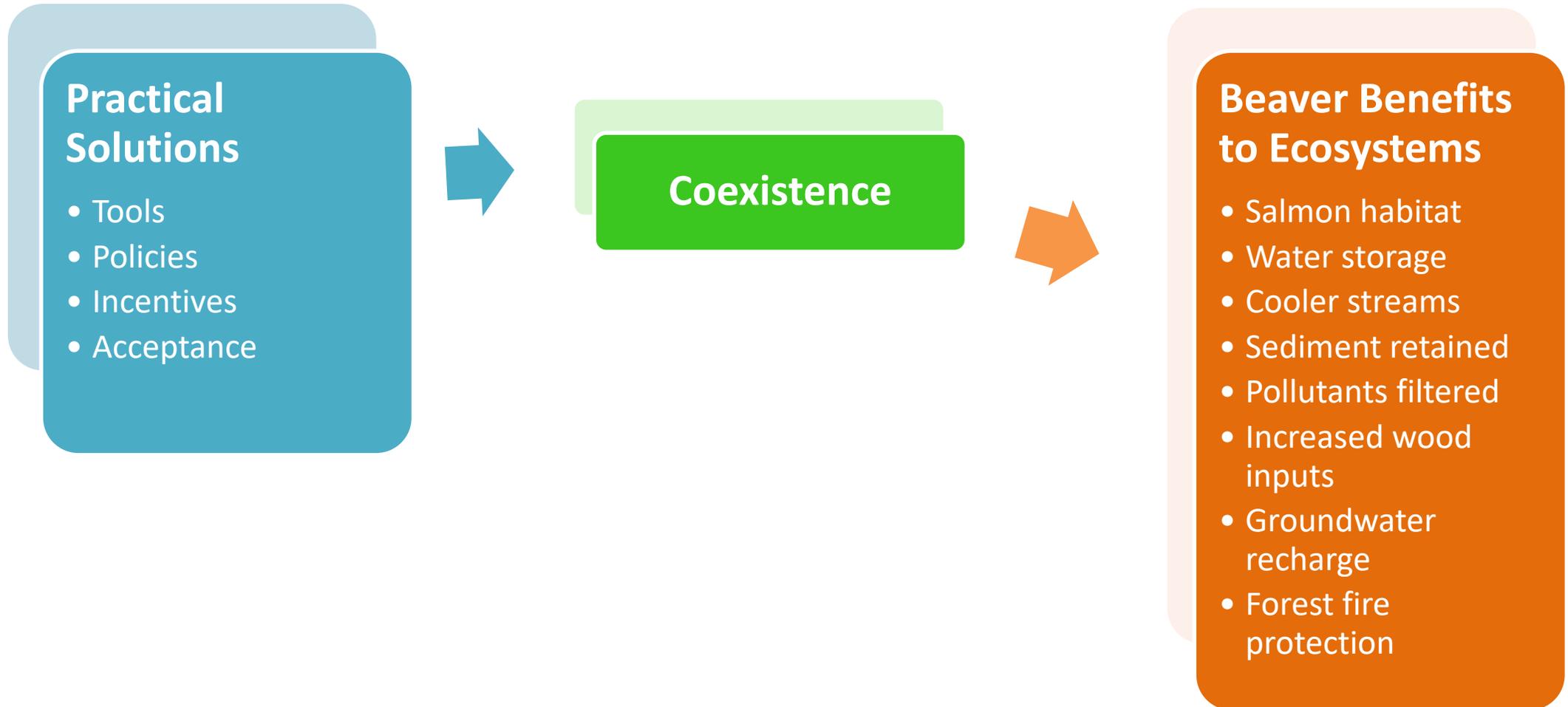
Multiple Choice

Beavers have been known to:

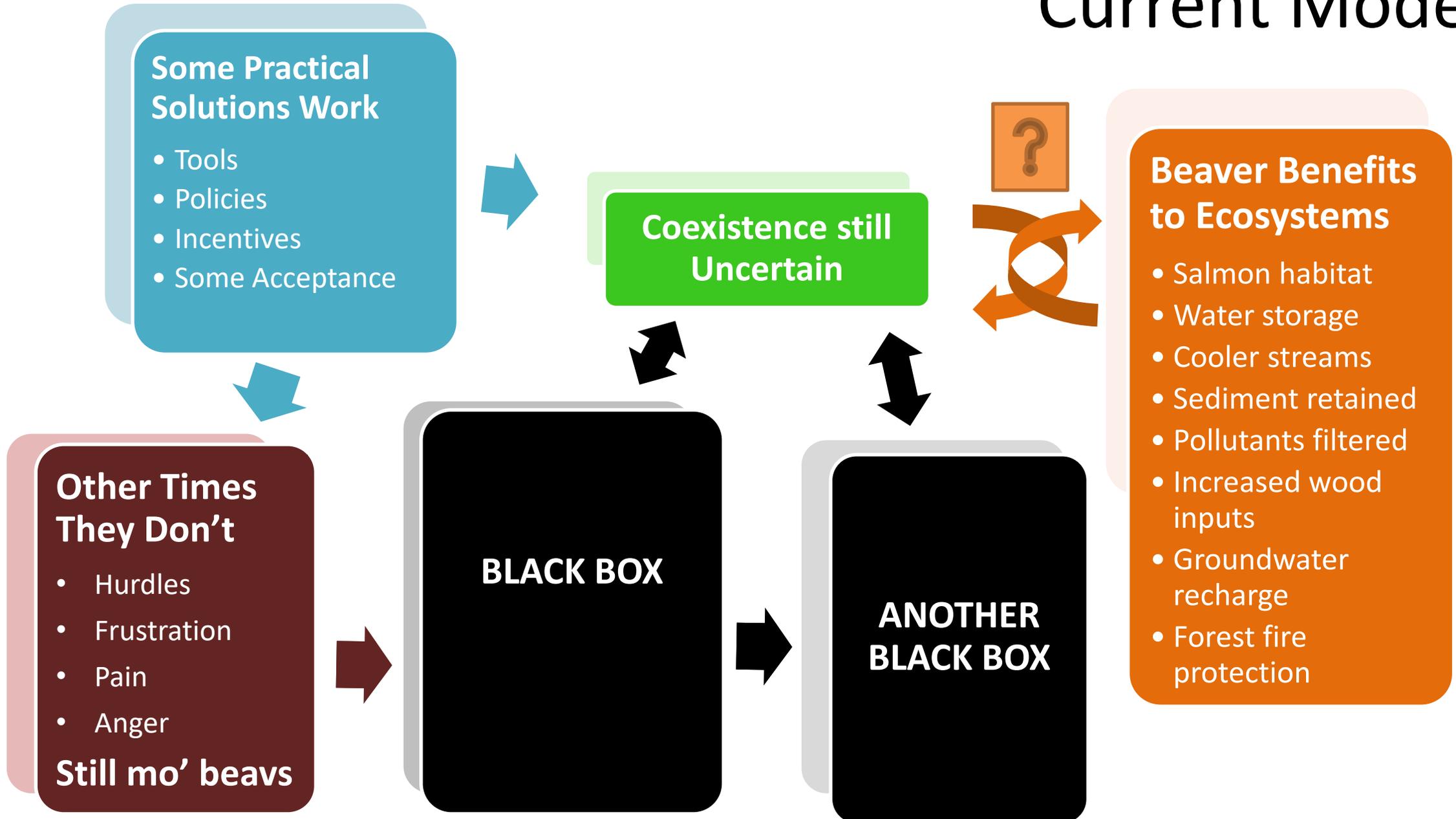
- a. Cut a hole in their dam in winter time to release water to create an air pocket between the pond ice and the water.
- b. Build lodges over 50 feet in diameter.
- c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
- d. Build an uphill canal system with locks to access a favorite tree species.
- e. Ignore leaks and spillways that form on their dams.
- f. Attempt to dam speakers that played sounds of running water.
- g. All of the above.



Utopian schematic



Current Model



The Goal

**Scientific
Foundation**



**Practical
Solutions**

- Tools
- Policies
- Incentives
- Acceptance



**Coexistence
(inc. conflict
management)**



**Beaver benefits
to Ecosystems**

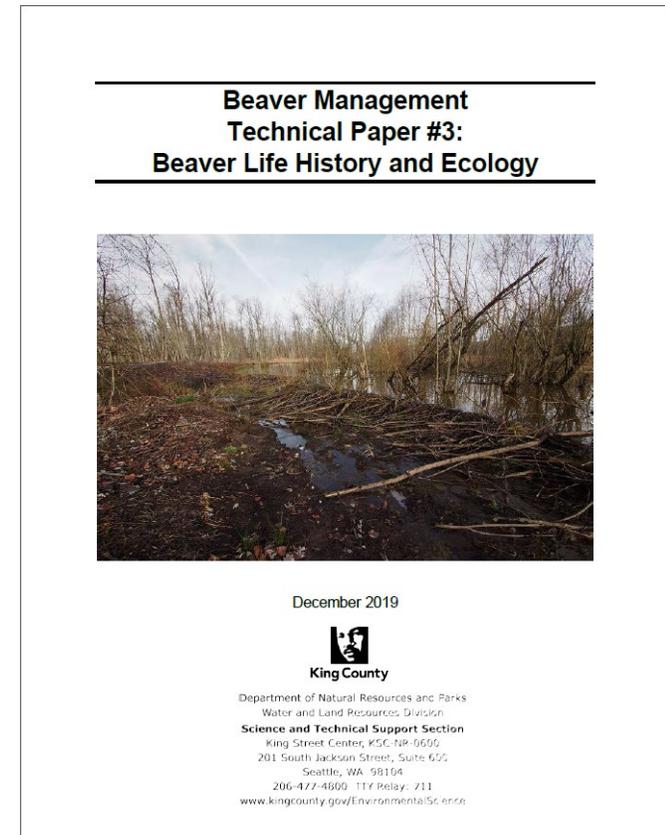
- Salmon habitat
- Water storage
- Cooler streams
- Sediment retained
- Pollutants filtered
- Increased wood inputs
- Groundwater recharge
- Forest fire protection



WORK OF THE BEAVER WORKING GROUP

Technical information to support decisions

- Beaver Life History and Ecology
Best Science Review (*draft under review!*)



Beaver Life History and Ecology

Best Science Review Contents:

Beaver Management Technical Paper #3: Beaver Life History and Ecology

1.0 Introduction

▲ 2.0 Beaver Populations

▲ 2.1 History

2.1.1 Historical Trapping

2.1.2 Reintroduction

2.2 Current population estimates

2.3 Carrying capacity

▲ 3.0 Biology

3.1 Size

3.2 Adaptations

▲ 3.3 Diet

3.3.1 Types of food consumed and seasonality

3.3.2 Preferred species

▷ 3.3.3 Amount of food

3.3.4 Re-sprouting species

3.3.5 Distance to forage

3.3.6 Winter food caches

3.3.7 Reingestion and Excrement

▲ 4.0 Life history

▲ 4.1 Colonies / Family Units

4.1.1 Colony composition

▷ 4.1.2 Colony size

4.1.3 Colony density

4.1.4 Colony longevity

▲ 4.2 Reproduction and productivity

4.2.1 Beaver longevity

▷ 4.2.2 Breeding age

4.2.3 Litter size

4.2.4 Density dependence and impacts of harvest

4.2.5 Timing of breeding, parturition, and emergence

▲ 4.3 Dispersal

4.3.1 Challenges with learning about beaver dispersal

4.3.2 Age at dispersal from the natal colony

▷ 4.3.3 Timing of dispersal

4.3.4 Direction of dispersal

▷ 4.3.5 Dispersal distance

▲ 4.4 Home Range and Territory

4.4.1 Defending territory

4.4.2 Permeable borders

4.4.3 Scent mounds

▲ 4.5 Illness and Death

▷ 4.5.1 Diseases and parasites

4.5.2 Predation

4.5.3 Other causes of mortality

4.5.4 Mortality rates

▲ 5.0 Engineering

▲ 5.1 Tree cutting for food and construction material

5.1.1 Tree size preferences

5.1.2 Distances traversed for trees

5.1.3 Size-distance relationship

5.1.4 Tree waste

5.2 Beaver ponds

▲ 5.3 Dams

5.3.1 Dam site selection

5.3.2 Dam building and repair

5.3.3 Dam size

5.3.4 Multiple dams per colony

5.4 Lodges

▲ 5.5 Canals

5.5.1 Canal engineering

5.5.2 Beaver canals in King County

6.0 References

Beaver 101: Dam vs. Lodge





**This
is a Dam.**

**Dams hold
water.**



**This is
also a Dam.**



**This is
a small
Dam.**



**This is
a Dam
in
Canada.**



**This is
a broken
Dam.**

Dam vs. Lodge



**This
is a Lodge.
Beavers live
here.**



**This
Lodge is
made of
larger wood.**



**This
Lodge is
made of
smaller wood.**



**This Lodge
makes 520
look Small.**



**It's over
50 ft wide!**



**This
is a
different type
of Lodge.**



**This
is a
different type
of Lodge.**



**This
is also a
bank Lodge.**



**This
is a BIG
woody
bank Lodge.**

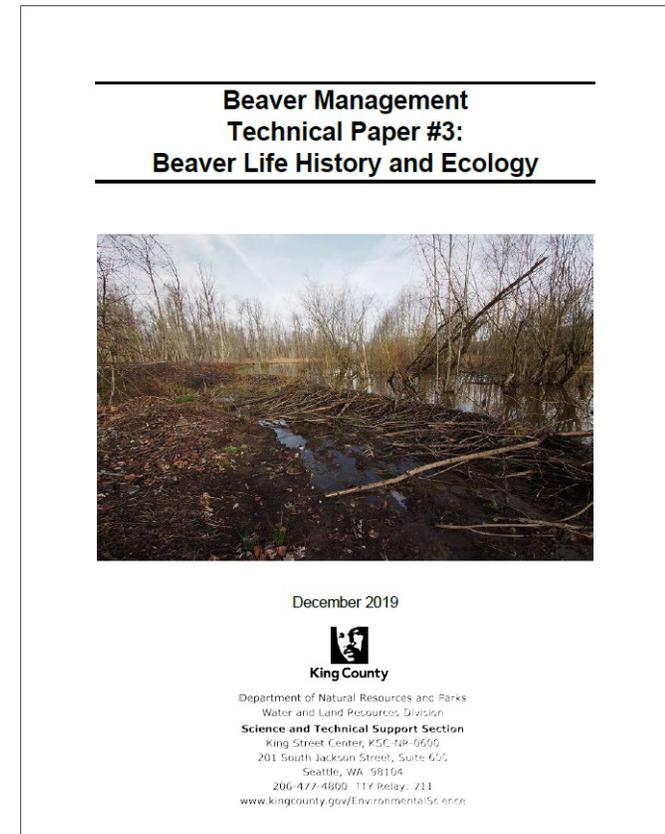
Dams Dam

Lodges Lodge

READ ALL ABOUT IT...

Technical information to support decisions

- Beaver Life History and Ecology
Best Science Review (*draft under review!*)
- Easy Guide to be developed



READ ALL ABOUT IT...

Technical information to support decisions

- Current Laws, Policies, and Practices
([Technical Paper #2](#)) + [Summary](#)

Beaver Management in King County: Summary of Current Laws, Policies, and Practices

State Laws

Washington Department of Fish and Wildlife (WDFW) sets and enforces the laws related to trapping and relocation of wildlife, including beavers. They also require permits for in-water work, including removal or manipulation of beaver dams.

Trapping

To summarize state trapping laws and regulations:

- The beaver is classified by Washington State as a furbearer ([WAC 220-400-020](#)). A trapping license and open season are required to recreationally trap a beaver. The recreational trapping season is set from November 1 to March 31. At any time of year, if an immediate threat to personal property exists, the property owner may kill or trap the beaver(s) on that property. In such cases, no special permits are necessary for the use of live traps.
- Body-gripping traps, defined as any trap that grips an animal's body or body part ([RCW 77.15.192](#), [77.15.194](#), [WAC 220-417-040](#), and [WAC 220-440-070](#)), always require a [Special Trapping Permit](#)¹, issued by WDFW and available by written application only. It is unlawful in Washington (RCW 77.15.194) to use a body-gripping trap to capture any mammal for recreation or commerce in fur; they are intended to be used on animals causing property damage or threatening human health or safety.
- The only body-gripping traps that may be authorized with a [Special Trapping Permit](#) include Conibear-type traps submerged in water, padded leg-hold traps, and non-strangling-type foot snares ([WAC 220-417-040](#)).
- Illegal traps with no exceptions are neck snares and unpadded, steel-jawed leg-hold traps.
- Legal traps are cage or box traps and suitcase-type live traps, including Bailey and Cornstock traps. These are legal for use during recreational trapping season or to resolve a property damage issue.
- All live traps must be checked within 24 hours of setting ([WAC 220-417-030](#)). All body-gripping traps (lethal or not) permitted under a STP must be checked every

¹ <https://wdfw.wa.gov/business/hunting/trapping>

Beaver Management Technical Paper #2: Current Laws, Policies, and Practices



September 2018



Department of Natural Resources and Parks
Water and Land Resources Division
Science and Technical Support Section
King Street Center, KSC, NR-0660
221 South Jackson Street, Suite 602
Seattle, WA 98104
206-477-4800 TTY Relay: 711
www.kingcounty.gov/Environment/Science

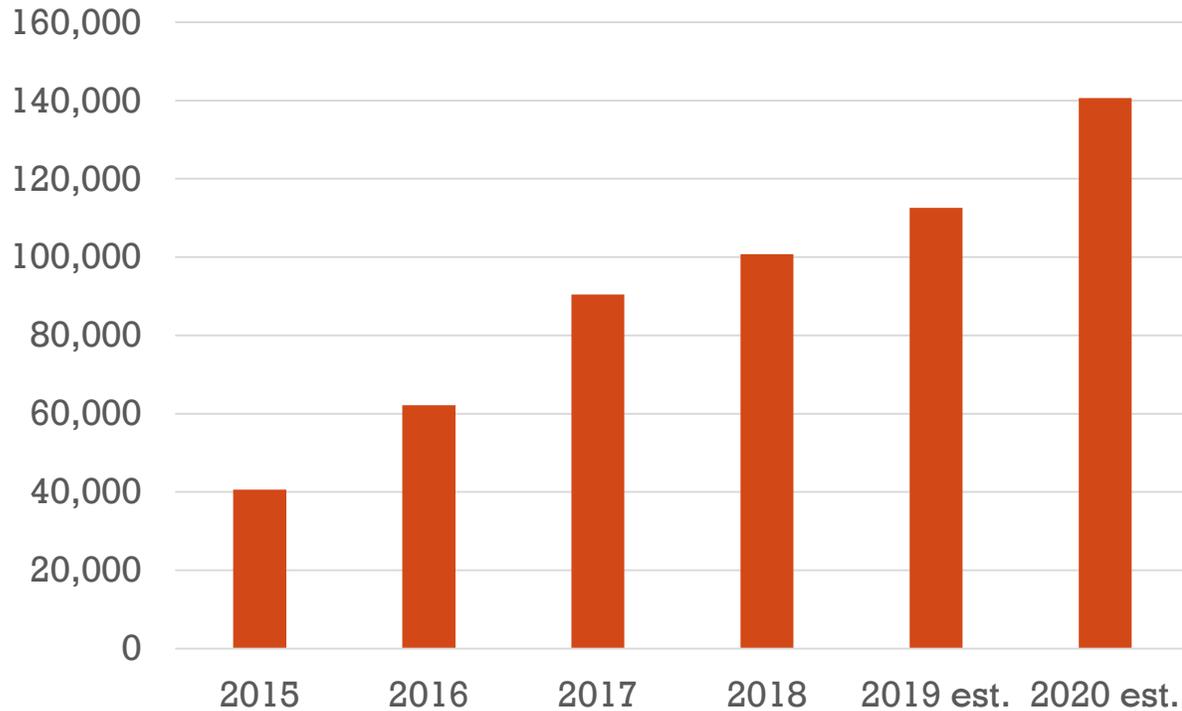
Alternate Formats Available

Think Like a Beaver



WE PLANT BEAVER FOOD (AKA TREES)

Trees planted by King County



THIS IS WHAT BEAVER HERBIVORY LOOKS LIKE



THIS IS WHAT UNANTICIPATED BEAVER HERBIVORY LOOKS LIKE



Before



After

THIS IS WHAT BEAVER-IMPOUNDED WATER

LOOKS LIKE



THIS IS WHAT WATER IN UNWANTED PLACES

LOOKS LIKE



Photo by Molly Alves

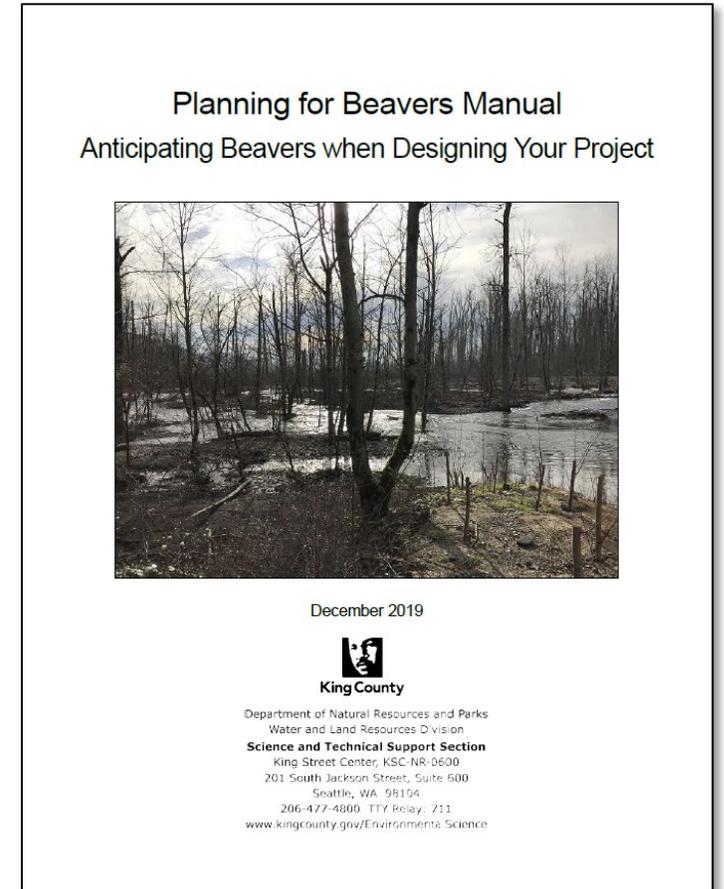
**THIS IS WHAT WATER IN UNWANTED PLACES
LOOKS LIKE**



PLANNING FOR BEAVERS MANUAL

Planning and design considerations

- Determining what areas might become wet when beavers arrive
- Responding to flood risk
- Planning for herbivory
- Getting the beavers to work for you



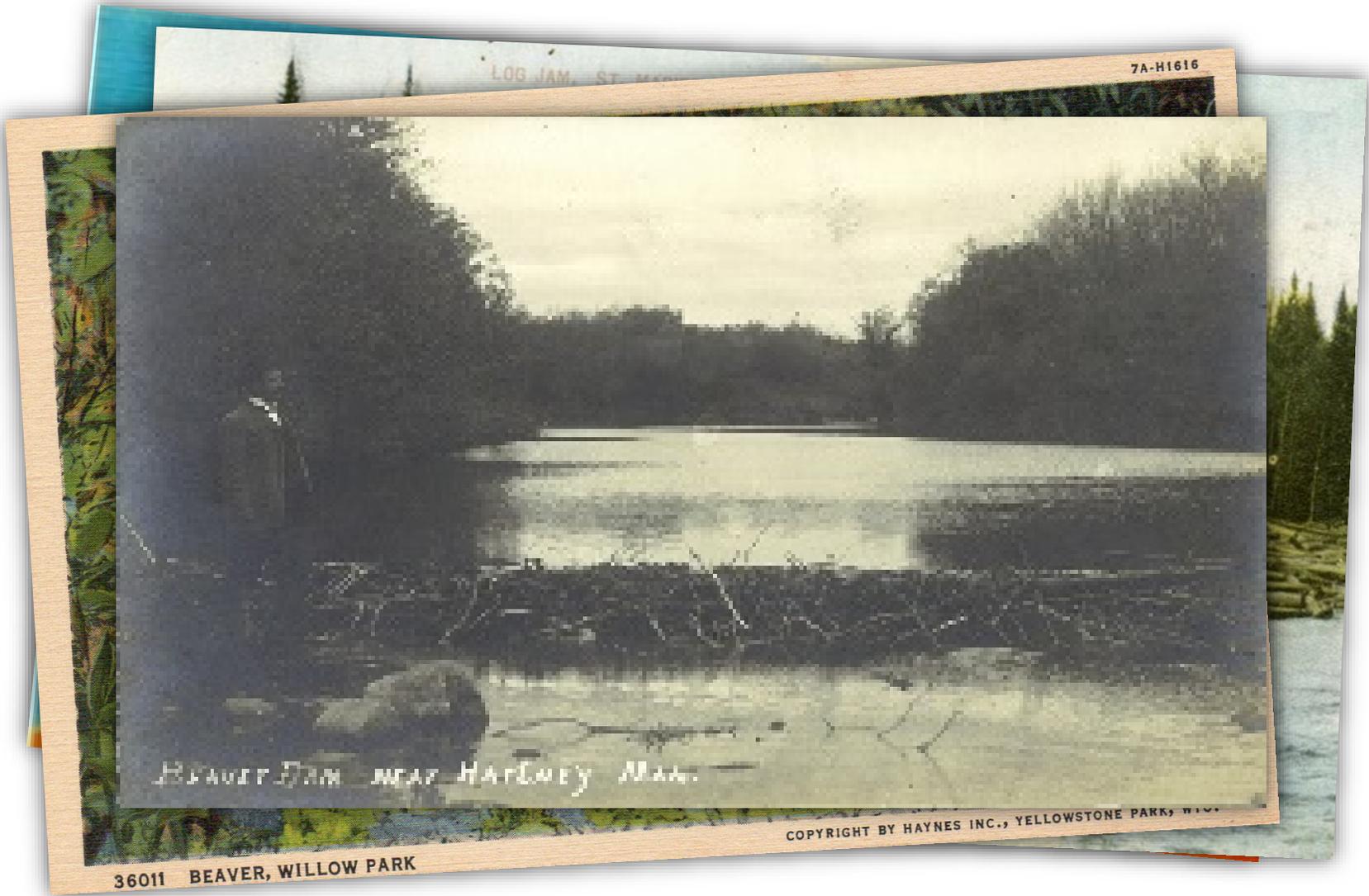
PLANNING FOR BEAVERS MANUAL

Planning and design considerations

- Determining what areas might become wet when beavers arrive
- Responding to flood risk
- Planning for herbivory
- Getting the beavers to work for you
- **Under Review Now!!**



Doing Science





**This
is a
Scent Mound**

FISH PASSAGE



Dams with devices - are they fish passable?

- Hydraulic Project Approval (HPA) permit required for instream work
- Currently pond levelers and other beaver devices not being permitted for fish passage concerns

FISH PASSAGE

Dams with devices - are they fish passable?



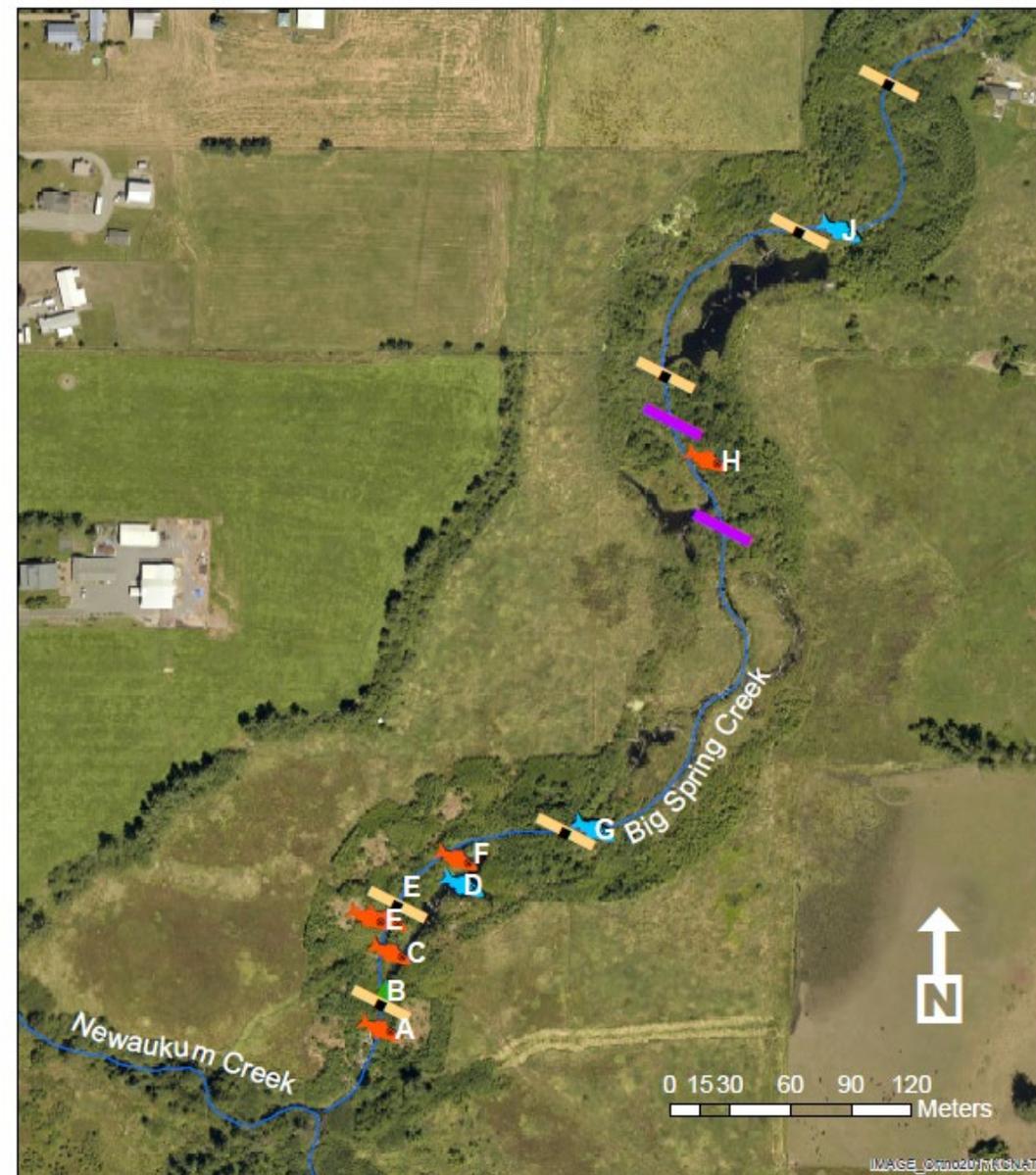
Dam, that's cool.

- Working with the state on permit criteria
- Designing studies to collect data
 - PIT tags with arrays
 - eDNA
- Studies to begin in 2020

FISH PASSAGE

Incidental Observations

- “Notes” paper from Big Spring Creek from Beavers Northwest and King County



**Big Spring Creek
Salmon Carcass
Observations
January 11, 2019**

Programs and Policies



36011 BEAVER, WILLOW PARK

7A-H1616

BEAVER

POLICIES & CODE

- Internal Policies
 - Who does what where when how & who pays for it
- King County Code Proposal
 - County permits related to beaver dams and devices
 - Tiered permit system to streamline process

I only follow laws of nature.



NEW PROGRAMS

Currently being scoped

- Beaver Response Squad
- Technical assistance – “BDAP”?
- Cost sharing



For more information:
Jen Vanderhoof, Senior Ecologist

jennifer.vanderhoof@kingcounty.gov

kingcounty.gov/beavers

