Postcards from Beaver World

Science Seminar
November 21, 2019

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This work funded by King County Surface Water Management (SWM) fees.
Beavers have been known to...
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b. Build lodges over 50 feet in diameter.
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c. Hold their breath for 20 minutes while performing highly strenuous work dragging and cutting large trees underwater the entire time.
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d. Build an uphill canal system with locks to access a favorite tree species.
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e. Ignore leaks and spillways that form on their dams.
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e. Ignore leaks and spillways that form on their dams.
f. Attempt to dam speakers that played sounds of running water.
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Utopian schematic

Practical Solutions
- Tools
- Policies
- Incentives
- Acceptance

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

Coexistence
Some Practical Solutions Work
• Tools
• Policies
• Incentives
• Some Acceptance

Coexistence still Uncertain

Beaver Benefits to Ecosystems
• Salmon habitat
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• Cooler streams
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• Increased wood inputs
• Groundwater recharge
• Forest fire protection

Current Model

Other Times
They Don’t
• Hurdles
• Frustration
• Pain
• Anger
Still mo’ beavs

BLACK BOX

ANOTHER BLACK BOX
The Goal

Scientific Foundation

Practical Solutions
- Tools
- Policies
- Incentives
- Acceptance

Coexistence (inc. conflict management)

Beaver benefits to Ecosystems
- Salmon habitat
- Water storage
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- 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 Management
Technical Paper #3:
Beaver Life History and Ecology

December 2019
King County
Department of Natural Resources and Parks
Water and Land Resource Council
Science and Technical Support Section
King County Council for the Arts
201 South Jackson Street, Suite 200
Seattle, WA 98104-4156

*360.772.6220*  *Thursdays, 2:30*  *www.kingcounty.gov/arts/scienceandtechsupport*
Beaver Life History and Ecology

Best Science Review Contents:

- 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 barriers
  - 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
Technical information to support decisions

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

- Easy Guide to be developed
Technical information to support decisions

- Beaver Management Tools Literature Review and Guidance ([Technical Paper #1](#)) + [Summary Matrix](#)
Technical information to support decisions

- Current Laws, Policies, and Practices
  (Technical Paper #2) + Summary
Think Like a Beaver
WE PLANT BEAVER FOOD (AKA TREES)

Trees planted by King County

- 2015: 38,000
- 2016: 40,000
- 2017: 60,000
- 2018: 80,000
- 2019 est.: 100,000
- 2020 est.: 120,000

Our Goal
1 Million Trees planted in King County by 2020, with help from our partners.

Our Progress
With our partners, we’ve planted 875,006 trees in King County on our way to 1 Million by 2020.
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
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
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• Determining what areas might become wet when beavers arrive
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• Under Review Now!!
Doing Science
This is a Scent Mound
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
Dams with devices - are they fish passable?

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

Dam, that’s cool.
Incidental Observations

- “Notes” paper from Big Spring Creek from Beavers Northwest and King County
Programs and Policies
Policies & Code

• Internal Policies
  o Who does what where when how & who pays for it
• King County Code Proposal
  o County permits related to beaver dams and devices
  o 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:

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kingcounty.gov/beavers