Foraging Behavior of Brown Bears (*Ursus Arctos*) in Relation to Human Activity and Salmon Abundance on a Coastal Alaskan Stream

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Background

- Demand for recreation opportunities increasing across Alaska
  - Wildlife viewing (bears)
  - Angling (salmon)
- Escalating human wildlife interactions
  - What are the consequences?
Study Area
Purpose

- Investigate effects of prey abundance and human activity on brown bear foraging patterns along the Chilkoot River
Objectives

- **Monitor bear behavior**
  - Number of bears, foraging behavior & habitat use
- **Record salmon activity**
  - Run timing & abundance
- **Document human use**
  - Numbers and types of recreational visitors
- **Compare effects of salmon activity and human use on bear behavior**
Methods: Sampling Zones

- 3 hr. observation sessions
  - Bears observed during 512 of 3600 total hours
Methods

- **Focal animal sampling**
  - Observations of bear behavior (activity budgets, habitat use)

- **Scan sampling** (15 min. intervals)
  - Estimate bear numbers
  - Estimate human numbers by user group

- **Fish counts**
Methods: Fish Counts

- Data from Alaska Dept. of Fish & Game weir

Chilkoot River Weir (Google Images)
Methods: Analysis

- Regression/Correlation Analyses

- Explanatory Variables
  - Total humans/scan (stratified by user group – anglers, non-guided tourists, etc.)
  - # of salmon
  - Environmental factors (temperature, river depth, etc.)

- Dependent Variables
  - Total bears/scan
  - Foraging location
  - Catch per unit effort
Results: Bears & Salmon

Bears and Daily Salmon 2001
n=95 days

Bears and Daily Salmon 2002
n=81 days
Human Presence

- Humans present in 80% of 14,590 scans (range = 0-485)
- 40% growth in visitation from 2000-2004
Results: Bears & Humans

Total Bears/Total Scans vs. Total Humans/Total Scans

<table>
<thead>
<tr>
<th>Years</th>
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<tbody>
<tr>
<td>2000-2002</td>
<td>-0.10</td>
<td>0.19</td>
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<tr>
<td>2003-2004</td>
<td>-0.35</td>
<td>0.17</td>
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Results: Bears & Anglers

- Bear activity inversely related to angler numbers
Results: Bears & Anglers

- Seasonal bear activity peaks when anglers are absent
Results: Bears & Anglers

- Daily bear activity peaks when anglers are absent
Results: Bears, Salmon & Anglers

Anglers, Bears and Salmon Activity

2001

2002

Anglers, Bears and Salmon Activity

Pink Salmon
Bears
Anglers

Anglers, Bears and Salmon Activity

Pink Salmon
Bears
Anglers

Anglers, Bears and Salmon Activity

Pink Salmon
Bears
Anglers

Anglers, Bears and Salmon Activity

Pink Salmon
Bears
Anglers
Results: Bear Foraging Behavior

- 71% of bear activity occurred at human distance >100 m
- When humans >100 m, bears capture 2.5 times more fish
- Salmon captures:
  - 38% live
  - 60% post-spawned
Conclusions

- At Chilkoot, more salmon ≠ more bears
- More anglers = fewer bears
- Spatial/temporal displacement = reduced foraging success
Implications

- Fishing restrictions
- Concentrated activity
- Bear access corridors
Acknowledgements

- Anthony Crupi (Alaska Dept. of Fish & Game)
- Alaska Chilkoot Bear Foundation
Results: Bear Numbers

5 year average:
- 6 adults, 5 subadults, 8 cubs per year
- No adult males
Results: Bears Habitat Use

The bar chart shows the percentage of adult habitat use across different types of habitats and years. The habitats are categorized as roaded riparian, nonroaded riparian, roaded estuary, and nonroaded estuary. The years compared are 2000, 2001, and 2002.