Thinking Outside the “Box”

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**Objective** - independent of individual thought

**Empirical** - originating in or based on observation or experience; verifiable

**Precise** - sharply defined or stated

**Logical** - inference and reasoning

**Parsimonious** - simplest of competing theories is preferred to more complex

**Probabilistic** - logical relation between statements, statistics
EXTRA! EXTRA!
READ ALL ABOUT IT!
FAKE NEWS!
critical thinking

noun

the objective analysis and evaluation of an issue in order to form a judgment.
"professors often find it difficult to encourage critical thinking amongst their students"

• Do your homework
  --Know your sources, ask experts, understand political agenda, know the science

• Don’t jump to conclusions

• Be open minded & willing to change perspective in light of data
Seven Critical Skills of a Well Informed Citizen

1. Critical Thinking & Problem Solving
2. Collaboration Across Networks
3. Agility & Adaptability
4. Initiative & Entrepreneurialism
5. Effective Oral & Written Communication
6. Accessing & Analyzing Information/Data
7. Curiosity & Imagination
WANDERLUST

(N.) A STRONG DESIRE OR URGE TO WANDER OR TRAVEL AND EXPLORE THE WORLD.
Wildlife Experiences are People Experiences

Wildlife management attempts to balance the needs of wildlife with the needs of people using the best available science. Wildlife management can include game keeping, wildlife conservation and pest control.
ecotourism

noun
tourism directed towards exotic natural environments, intended to support conservation efforts and observe wildlife.
Lessons Learned…

- People perspective
- Outsiders looking in approach doesn’t work
- Build trust & community
- Compassion/Empathy—at conflict with science???
Soak it All In
Decision to List
Lessons Learned…

- Importance of becoming part of a community
- Education works both ways
- Listening goes a long way
- Reputation is important
Lake Kilroy Fisheries Management Plan
The Players
Lake Kilroy Fisheries Management Plan

Management Goal: To reduce competition between bass and brook trout

Objective:
1. Determine overall fish condition using calculations of relative weight (Wr).
2. Use proportional stocking densities of predator and prey species to determine if current management goals are being met
Lake Kilroy Fisheries Management Plan

The management goal is being met if…

Objective 1: overall fish condition is good or very good

Objective 2: proportional stock densities indicate that the lake supports a high population of small predators and relatively large prey
Electroshock Fishing
Data Collection
Relative Weight

\[ Wr = \left( \frac{W}{Ws} \right) \times 100 \]

**W** = weight of the individual fish

**Ws** = length-specific standard weight for the species.

Length-specific standard weights were calculated based on published formula for each species.

The ideal range is anywhere at or above 90
Proportional Stock Density

The index **proportional stock density (PSD)** =

\[
(\# \geq \text{min. quality length} / \# \geq \text{min. stock length}) \times 100
\]

Index values range from 0-100.

For largemouth bass the proposed maximum length (cm) for quality fish is 30 cm and 20 cm for stock fish.

For bluegill the proposed maximum length for quality fish is 15 cm and 8 cm for stock size fish.
Results

Catch Per Unit Effort (CPUE)

Table 3. Catch per unit effort for largemouth bass and bluegill/pumpkinseed caught and removed from Lake Kilroy between 2010-2015 during 150 minutes of sampling. Note decreasing numbers each year indicates an overall reduction in population.
## Results

### Relative Weight

<table>
<thead>
<tr>
<th>Species</th>
<th>Total Number</th>
<th>Total Weight (kg)</th>
<th>Average Size (mm)</th>
<th>Average Relative Weight (Wr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largemouth Bass</td>
<td>64</td>
<td>12.96</td>
<td>239.3</td>
<td>86</td>
</tr>
<tr>
<td>Bluegill &amp; Pumpkinseed</td>
<td>143</td>
<td>7.73</td>
<td>141.19</td>
<td>88.4</td>
</tr>
</tbody>
</table>

The ideal range is anywhere at or above 90
# Results

Proportional Stock Density

<table>
<thead>
<tr>
<th>Species</th>
<th>&gt; Stock Size</th>
<th>&gt; Quality Size</th>
<th>Proportional Stock Density (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Largemouth Bass</td>
<td>11</td>
<td>52</td>
<td>21</td>
</tr>
<tr>
<td>Bluegill &amp; Pumpkinseed</td>
<td>60</td>
<td>143</td>
<td>42</td>
</tr>
</tbody>
</table>

Predator species should be in the range of 40-60%.

Prey species should be between 20-40%.
Figure 6.4 Tic-tac-toe graph comparing proportional stock densities of predators and prey. Parallel lines bound the desired PSD ranges. Potential interpretations for the different combinations are: A = mutual balance for satisfactory fishing; B = community comprised of large, old specimens, indicative of an unfish population; C = large predators excessively cropping large prey; D = overfishing of predators and stunting of prey; and E = high population of small predators excessively cropping young prey.
Lake Kilroy Fisheries Management Plan

Management Goal: To reduce competition between bass and brook trout
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Find your Drum Line

- Get outside the classroom and expand horizons
- Get outside your comfort zone
- Be tenacious ask questions but don’t forget to listen
- Step outside your role

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