Adapting your work to climate change: A Framework

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Point of Clarification

- **Mitigation** is what we do to decrease the potential of climate change itself.
  - \( \downarrow \text{GHG emissions} = \text{a safe car on a good road} \)

- **Adaptation** is insurance given a non-zero probability that climate change will have an adverse affect on your investment
  - \( \downarrow \text{limiting the impacts} = \text{wearing a seatbelt} \)
Does climate change matter to me?
Does climate change matter to me?

Do you live on planet Earth?
“Houston, we’ve had a problem.”

-Jack Swigert
Astronaut, Apollo 13
Improving Forest Management

Δ Temperature

Cumulative Volume Killed on the Timber Harvesting Landbase

- Projected Kill
- Observed Kill

BC
Alberta
Increasing Connectivity & Protected Areas

Δ Temperature
Restoration

Warming water, range shift
Water Allocation

Altered precipitation patterns
Improving water quality

Synergistic effects
Climate change is affecting all ecosystems, and will continue to do so for centuries, so...

- We need to incorporate climate change into long-term planning
  - Minimize risk of wasting time, money, and effort
  - Maximize likelihood of success
But what can I do about it?
Adaptation Options

Vulnerability

Resistance Resilience Response

For more on this, see the 3 Little Pigs Advice Column on www.cakex.org
Climate change is complicated, I don’t know what’s going to happen!

How can I possibly know what to do?
“Don’t Panic.”
-Douglas Adams
Hitchhiker’s Guide to the Galaxy
Should I take my umbrella?
Reducing vulnerability

Vulnerability = exposure + sensitivity - adaptive capacity

\[ \downarrow \text{Reduce exposure} \]

\[ \downarrow \text{Sensitivity} \]

\[ \uparrow \text{Increase adaptive capacity} \]
EcoAdapt’s Five Tenets of Climate Savviness
1) Protect adequately and appropriately for a changing world

Plan spatial, think temporally!

- Refugia
- Gradients (Latitudinal/Elevational)
- Heterogeneity
- Gene flow/Connectivity
- Inclusion of other changes in the watershed/landscape/seascape
2) Reduce non-climate stresses

Invasive & Pest Species

Agriculture & Habitat Fragmentation

Pollution & Habitat Degradation

Unsustainable Harvest
3) Manage for Uncertainty
4) Reduce local and regional climate change
5) Reduce Greenhouse Gas Emissions

Resilience options have limits, some systems are very limited

Polar habitat, high elevation habitat, oceans…
“There is no box.”

-Amory Lovins
Water Quality

Lake Champlain

Δ Precipitation, water level & flow rate ➔ Phosphorus

Solutions!

• Sue EPA over TMDL permits failures
  Used 1991 flow rates
  Ignored climate change impact on water level, flow, temperature, & potential waste management system failures

• EPA recalculates TMDLs to be climate smart (but only here)
Managing Fisheries

Temperatures, Acidification, Existing Management

Solutions!

“If you don’t know, don’t go”
Closure of rapidly changing regions, especially those lacking management plans
Protecting Snow and Ice

Warming air temperature, changing precipitation

Solutions!

• Cover glaciers with insulating blanket during summer months
• Reduce disturbance of glaciers
Building Infrastructure

- Build on coasts planning for sea level rise
- Build roads planning for beach migration

Temperature, altered rainfall, existing codes

Solutions!
Smokey the Bear
Here

CAN MAKE ADAPTATION HAPPEN