

SAMBAA K'E

Paradise River
Ndu Tah Deh
éhdhaah Dehé

Our vision for our river

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|---|---|--|---|
| <p>Connection to Adu Tah Deh</p> <p>Past</p> <ul style="list-style-type: none"> • Transportation to traditional Areas • Cultural locations along river • Harvesting Plants + Animals • Fishing + fish net setting • Access to Lakes • Agriculture • Spiritual <p>Present</p> <ul style="list-style-type: none"> • Access (road / Recreation) • Tourism • Agriculture • Spiritual | <p>Erosion/instability Changes</p> <ul style="list-style-type: none"> • Unstable cut banks + Point bars • Deposition at river mouth (Access) • Deposition accumulating + creating new • Undercutting + ice gouging • Tree fall into river (Access) • Permafrost thaw? (Concentrator) • River Water level instability • ↑ in chance of ice jams + flooding • Jeopardization of Black dog creek • Impact to future development • Winter road crossing • Changing historical travel routes • ↑ in [sediments + ions] • ↑ Navigation Challenges due to [ice jams + wild fire] | <p>Causes of Erosion + instability</p> <ul style="list-style-type: none"> • AS in water quantity • Ice + log jams • Gravity (Natural Processes) • Natural river processes • Permafrost? - contributor • Vegetation changes • AS in hydro period + vegetation • Wild fires + vegetation | <p>How is it affecting SKFN?</p> <ul style="list-style-type: none"> • Access • Navigation • Recreation • Traditional harvesting • Water quality changes • Flooding • Winter road • Challenges in monitoring |
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SKFN in 25 years

- move the "old community" houses
- more south to higher elevation
- more infrastructure such as community garden
- more + give river space
- follow Dene laws - respond to change in the river, no hardening infrastructure
- stewardship approach
- holistic monitoring program to inform this

Where we are +

STEP 1
(Recognize the Problem)

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| <p>Step 1 - Recognize the Problem</p> <ul style="list-style-type: none"> - SKFN is aware erosion & Deposition is occurring - SKFN has evaluated that the threat is Low to People + infrastr. | <p>Types of Erosion in Sumbaa K'e</p> <ul style="list-style-type: none"> • in-channel bar deposition & directing flow • Ice Jam Erosion • Bank failure after tree fall • Permafrost induced Bank failure • Thermo karst Erosion • Outer bank erosion • Toe erosion • Gully erosion • Shoreline erosion due to ice push • Bank under cutting. |
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STEP 2
(Manage the Threat)

Manage the threat.

- Threat is Low
- Low risk means low priority for intervention
- * Move Black Dog Creek walking trail away from high risk banks
- Manage through monitoring & info sharing

STEP 3
(Gather/Assess info)

Gather info

- Perform Rapid Geomorphological Assessment.
- integrate river + Shoreline monitoring into Guardian Program for Protected area
- Ex. Active Layer, Ground temp, Water level, Rate of erosion / Deposition, winter road crossings

STEP 4
(Evaluate Options & Plan)

STEP 5
(Take Action)

LOOKING FORWARD

Challenges + Barriers Challenges

LOOKING FORWARD

CHALLENGES ⊕ BARRIERS

Challenges & Barriers

- Multiple rivers & shorelines changing
- Complexity of logistics
- Complexity of driving forces in multiple systems (ie different rivers)

Challenges & Barriers

- Selection of solutions which align with Dene Law.
- Implementation of solutions across large geographical extents
- Addressing issues upstream cause issues downstream

Ideas & Solutions

- Integrated monitoring approach
- Water quality + quantity
- Permafrost
- river change
- river depth
- Hazard mapping along rivers

IDEAS ⊕ SOLUTIONS

Challenges + Barriers

1. Capacity
 2. Time
 3. Funding
 4. Need knowledge synthesis from multiple disciplines
- Ex. Geomorphology
Permafrost + hydrology
Aquatic Ecology
Limnology
Geotech
Land use planning
Traditional knowledge

Challenges & Barriers

- Knowledge level in community
- Capacity to manage local data
- Capacity & expertise in analyzing data
- Training in field techniques
- Large extent.

Ideas & Solutions

- Protected Area & Community LUP should have Environmental Sensitive areas - rivers, shorelines, thermo karst features
- Snow piling By-Laws
- Trail By-Laws or Guidance Documents

Ideas & Solutions

- Challenge: Navigation
Solution: river + Shoreline Bathymetry
- Challenge: Sediment Deposition at river mouth
Solution: dredging? redirection of sediment.
- Challenges: Flooding
Solution: Break up monitoring

Ideas & Solutions

- log removal along Banks while leaving root structure
- Wild fire Prevention
- Engineering Solutions in certain areas

Ideas & Solutions

- Repeated photos + Remote sensing monitoring.
- Winter road deconstruction to prevent scouring + Jamming → facilitate thaw
- Re-forestation + live staking Banks affected by wild fire

Priorities

- GIS training for Communities
- Geomorphology training for GH
- Desktop analysis
- Flood Hazard Markers + trigger thresholds

Ideas & Solutions

- Desktop analysis
- Change over time
- Meander Belt
- Discharge projections under climate change
- Relocate cabins / Build new ones (risk assessment)
- Permafrost Mapping
- Identify high risk areas for ground cracking

Questions ⊕ Needs

Questions

- How much space does the river(s) need?
- What is the Avg. root depth? / Bank height?
- What are the secondary impacts of erosion on... water quality, TSS, river bed, fish invertebrates, nutrients metal transport.

Questions

- How do Beavers impact erosion + how does removal of Beaver Dams impact erosion.
- How can rip-rap be used in a way which limits impacts to vegetation, wildlife & water quality [DFO]

Priorities

- Increase effectiveness & robustness of flood risk mapping
- Model ice jams
- Change runoff coefficients to fit Burnt catchment

Priorities ⊕ Next Steps

Samba Ké

- connection: ^{→ water rd crossing}
 - fragmentation - access lake via river (too wavy in lake)
 - cultural + spiritual
 - harvesting - traditional medicines that grow on banks.
 - fishing, spring hunt.
 - recreation + tourism
 - safety w/ unfamiliar changes

- changes
 - unstable cut banks, pt bars ↑
 - deposition of sediment at river mouth → permanent huge sandbar. is was seasonal, now all year → affects ice safety. (freeze up, break up).
 - deposition → new pt bars/islands in river
 - banks becoming undercut by undercut, trees fall over, log jams.
 - sporadic permafrost. seeing shallow slides.
→ need to more hiking trail.
 - increase in suspended sediment in river → how is this affecting fish + water quality? see drop in fish stocks.
 - navigation - need to change travel routes because of sand bars. need more info to reform navigation
 - cyanobacteria - is appearing
 - more challenging to get up river for monitoring, building outcrops.
 - wildlife changes.
- threatened: a few horses, community garden.

- drivers
 - change in water quality
 - ice scouring of sides (low river)
 - big logs in river (due to undercut + tree fall)
 - change in veg along rivers - is veg not anchoring the sediment? how is it affecting
 - spring freshet different - timing +
 - wildfires

① is there longshore current along lake shore affecting sediment deposition?