

The influence of a changing climate

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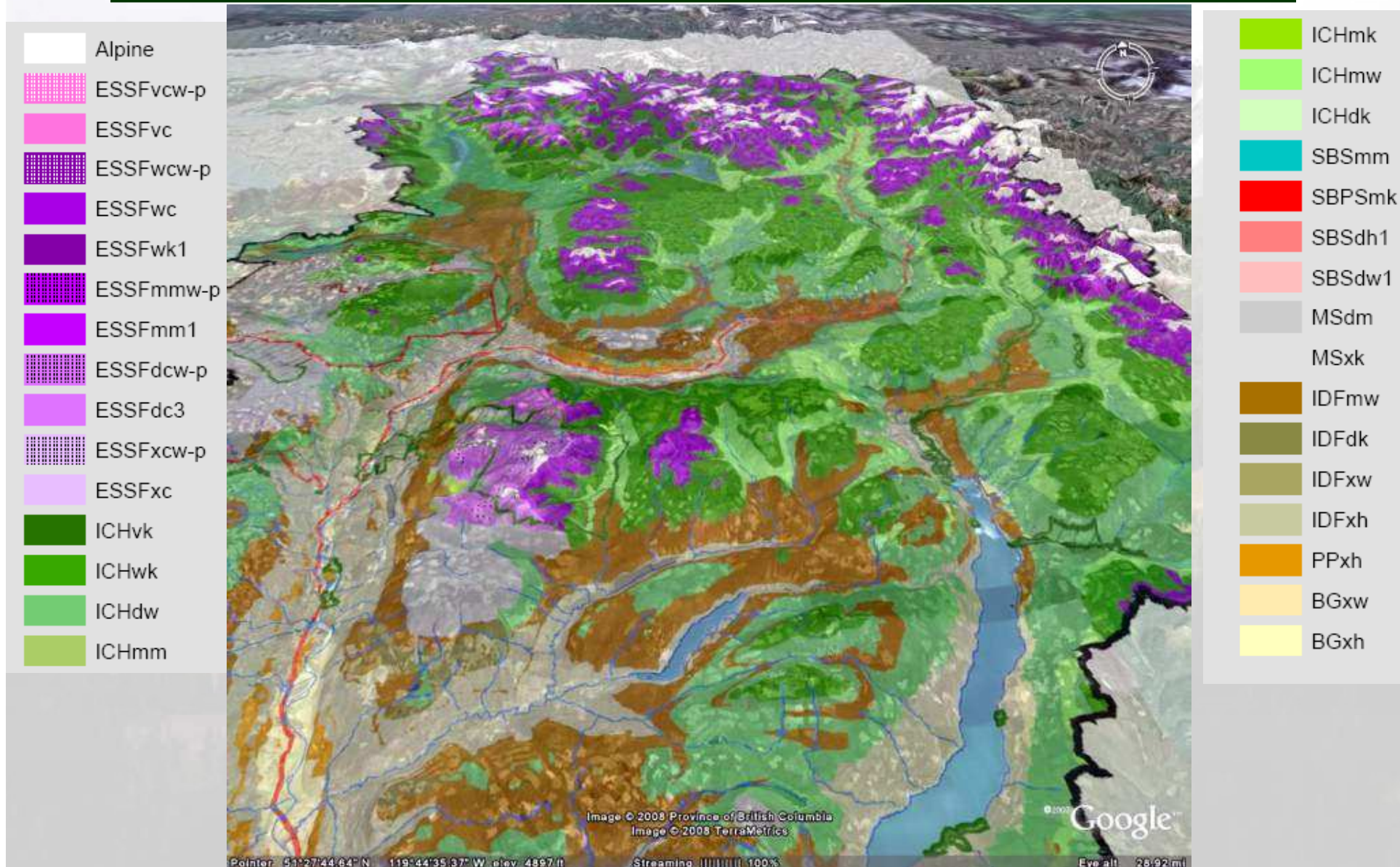
On Forest Ecosystems

Cam Brown Forsite Consulting,
K2 – Kamloops Future Forest Strategy (Phase 2)

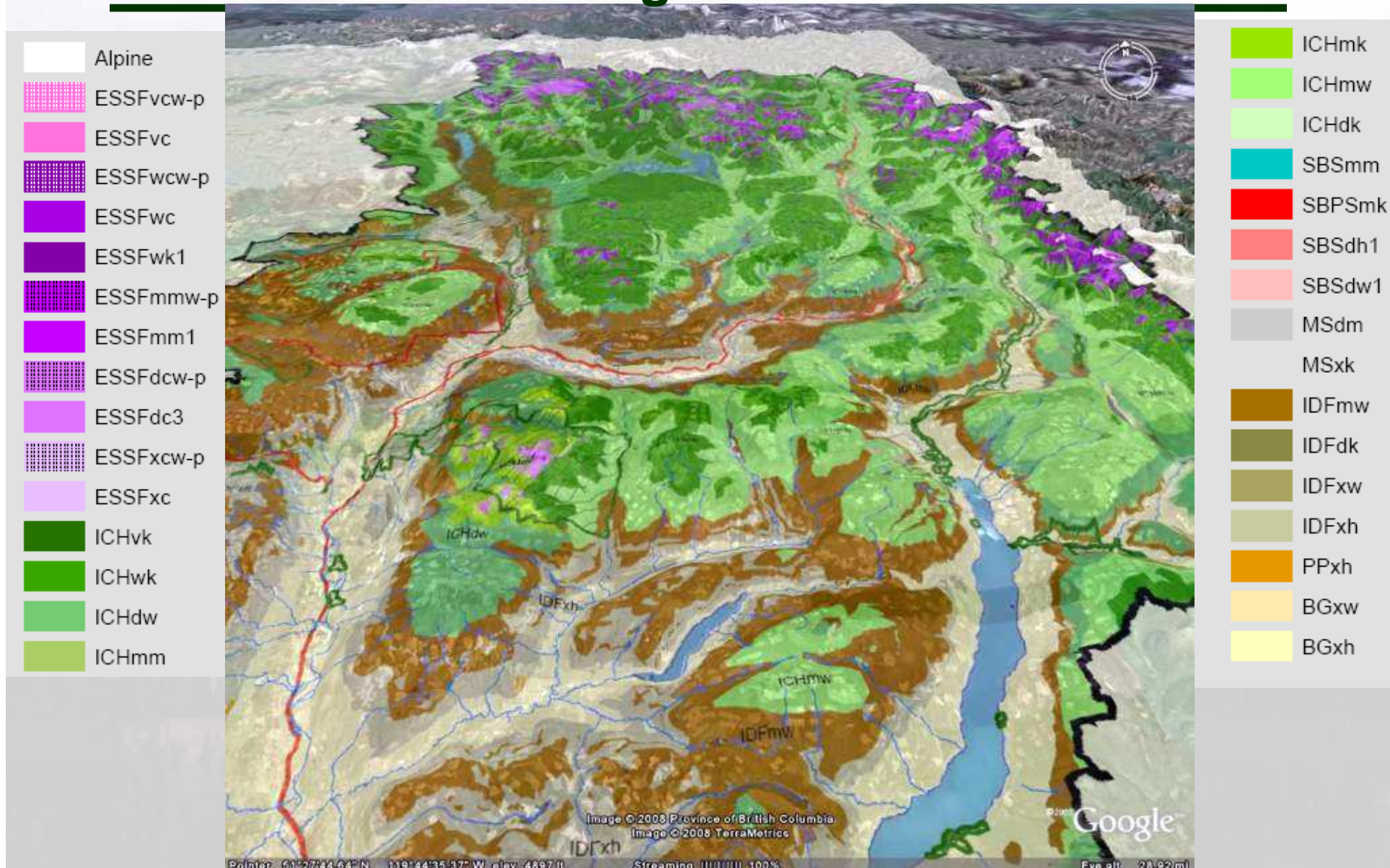
Northern Half of TSA... Current Ecological Zonation



One possible future (2050) – expressing climate as “ecosystem-climate envelopes”



Another possible future (2050) – We could have this much change...



Assessment of Ecological Sensitivities

SENSITIVITIES

1. *Ecological Sensitivities* – due to increased amount and rate of ecological change.

Specialist Discussions and Literature Reviews to ID key sensitivities and opportunities



Stand or tree vigor?



Other Plants?

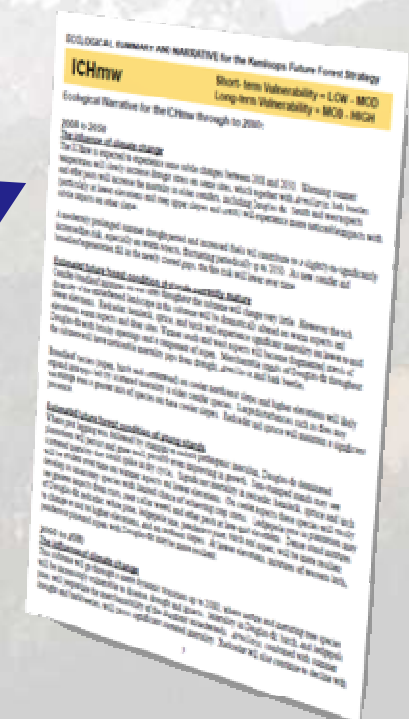


Insects and Disease Impacts?



Abiotic disturbance

Ecological Narratives



Just a caution on what is to come...

None of this is TRUE or REAL...



BUT – It is:

- Less unbelievable than assuming nothing will change.
- Plausible- based on what we know now.



Transitional Forests – Warm, Moist to Drier



**Green and Brown
Areas**

Numerous species –
Douglas-fir, cedar,
hemlock, aspen, birch,
spruce, pine



2008-50 Transitional Forests (Mod - High Sensitivity)

General climate influences :

- Drought stress – Significant in lower valleys
- Tree root disease, and insects - will increase – root disease may decline by 2050 in lower valleys.
- Fire Risk - Major increase in lower valleys, with some significant risks at mid elevations.



2008-50 Transitional Forests (Mod - High Sensitivity)

Future forest conditions – current mature stands :

- Mixedwoods forest on warmer aspects - low to mid elevations
 - significant mortality in cedar, hemlock, birch and spruce.
 - May lose birch and cedar in valley bottom – except wet sites.
- Douglas-fir dominated stands - Will become fragmented Douglas-fir stands with brushy openings, significant dead trees, and patches of aspen (and birch in moister valleys).



2050-80 Transitional Forests (Mod - High Sensitivity)

General climate influences :

- Further drought stress PLUS more aggressive insects - bark beetles (possibly tussock moth) and in places, disease – high levels of mortality.
- Significant increase in fire risk - increased fuels with prolonged summer drought.
 - Chance of larger fires increases significantly
- Significant increases in invasive plant species – due to increased disturbance.



2050-80 ICHmw Ecol. Narrative –Mod-High Sensitivity :

Future forest conditions – mature stands :

Mixedwood Forests - Mature Douglas-fir will be more patchy and fragmented within mixedwood forest with brush =/or aspen patches.

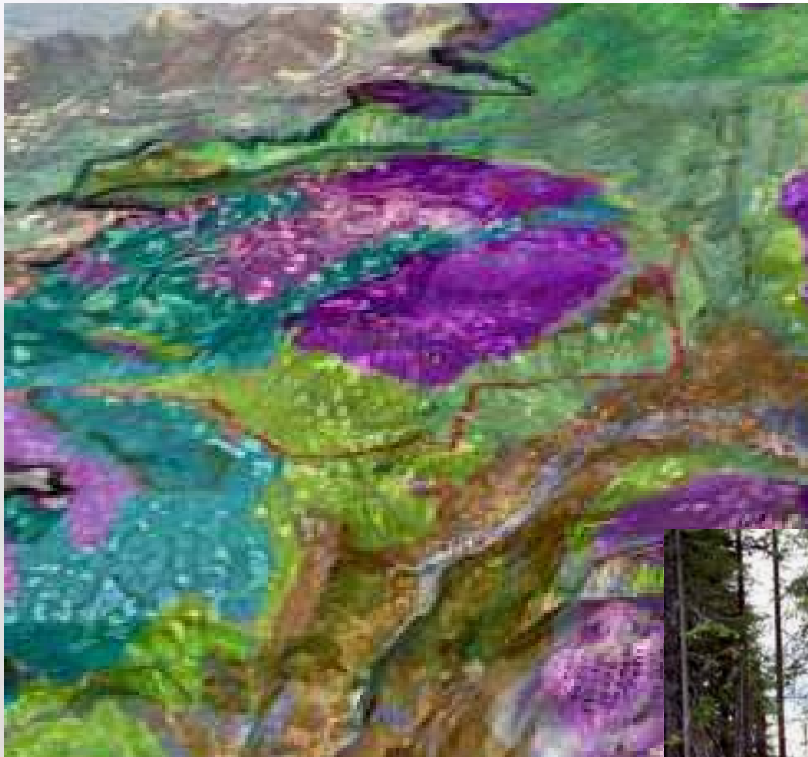
- Harvestable older stands of timber - harder to find.

Douglas-fir Forests – Few other tree species mixed in (perhaps aspen)

- Discontinuous on warm aspects and low in valleys – grassy patches.



Dry-Moist Plateau Forests



Blue Areas – much of the TFL

- spruce and pine dominated



2008-50 SBSmm Ecol. Narrative – Mod Sensitivity :

General climate influences and resulting stands :

- Moderate impacts up to 2050. Snowpack likely will be similar.
- Douglas-fir and spruce - Likely improved growth and vigor.
- Spruce and balsam - localized bark beetle damage
- Risk of large wildfires - slightly higher (with increased pine mortality)



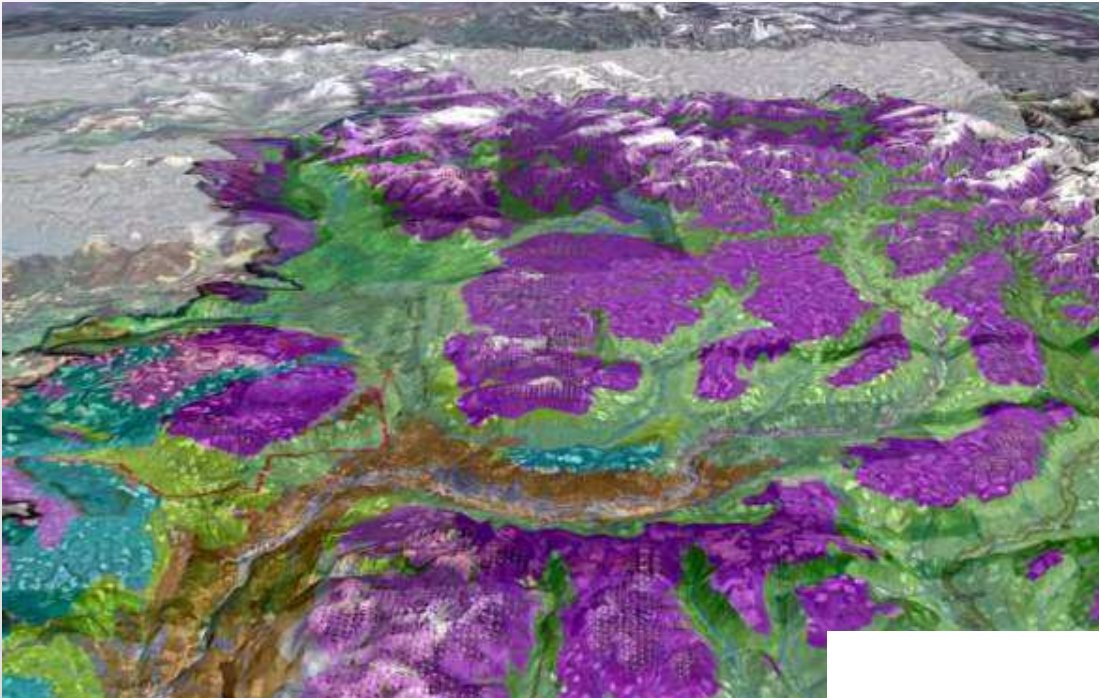
2050-80 SBSmm Ecol. Narrative – Mod-High Sensitivity :

General climate influences :

- Summer – very warm and slightly drier – similar to Thompson Valley.
- Douglas fir – vigorous – only some stress on warm dry slopes.
- Aspen – patches will spread and increase in vigor.
- Spruce and Balsam – reduced growth – considerable mortality in balsam.
- Root disease mortality - will cause dead patches throughout.
- Other mortality - from a range of insect-drive disturbances
 - Less predicable and more severe
- Risk of large fires - will be high at times with dry cycles.



Cool and Wet High Elevation Forests



Purple Areas –
High elevations
spruce and balsam
dominated



2008-50 Cool/Wet High Elevations – Low Sensitivity :

General climate influences :

- Minor impacts to 2050
- Summers may be slightly drier, extended growing season
- Slightly less snow and shortened snow season
- Mature tree growth up, but may be a few problems in some years
- Fire risk not huge (but increasing)



2050-80 Cool/Wet High Elevations – Mod Sensitivity :

General climate influences :

- Most mature stands - will maintain vigor and health
- Some mortality – warmer, drier slopes and ridges.
- Risk of fire – may increase from low up to moderate.
- Snowpack - beyond 2050 may be significantly reduced but will still be relatively high.
- Lower elevations – reduction in snowpack possibly by several weeks.

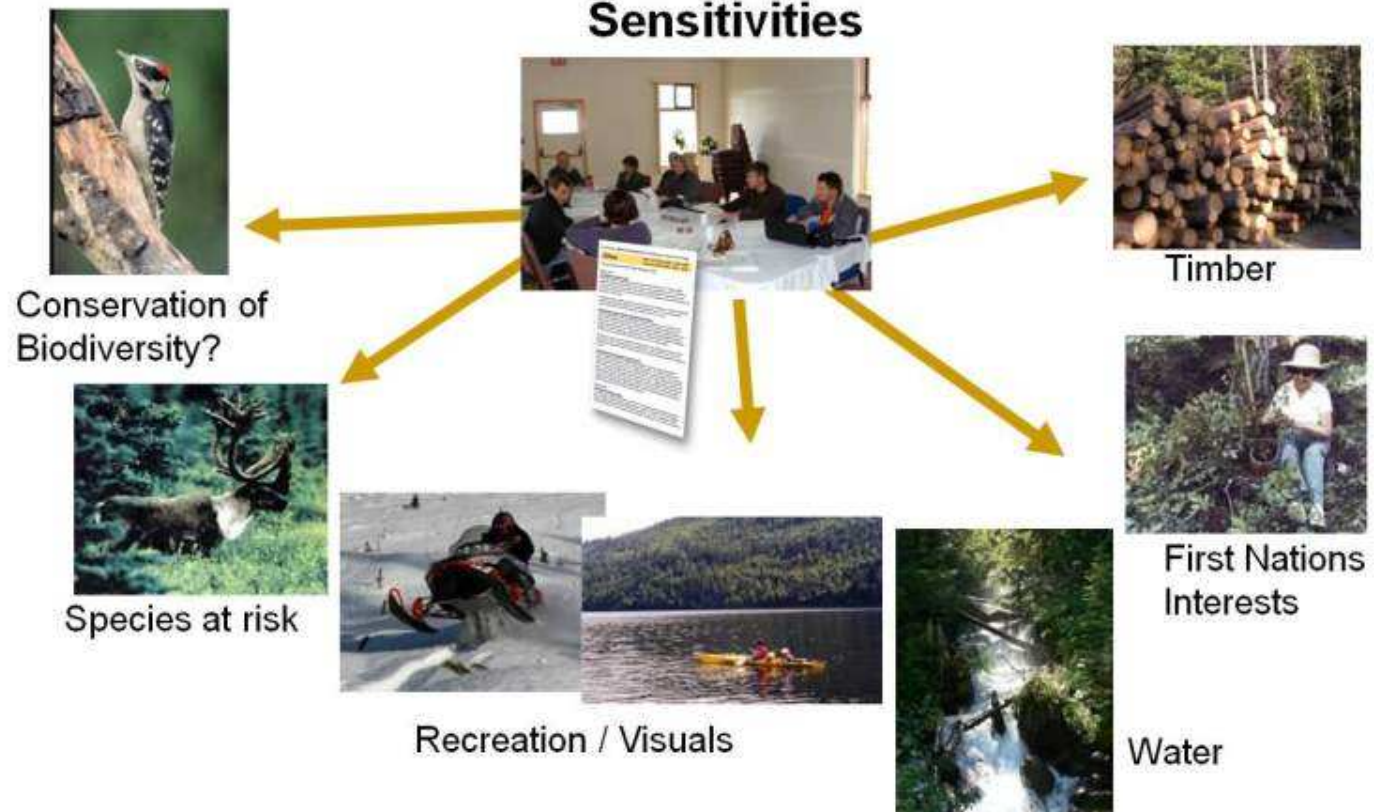


Assessment of Management Sensitivities

SENSITIVITIES




2. *Management Sensitivities* – expected impacts on key aspects of management values over time.

Specialist Discussions using Ecological Narratives and Sensitivities



GENERAL TRENDS - Management Sensitivities

Summary with 5 Broad Ecological Zones

SUBZONE GROUP	% of the TSA	Management Sensitivity	Summarized Rationale for Sensitivity
 <p>Warm Moist – Dry Transitional Forests</p>	26	MOD-HIGH	<ul style="list-style-type: none"> • High impacts on timber volumes and values. • Significant issues on biodiversity, habitats and fish, water, fire in the urban interface, and visual quality
 <p>Dry- Moist Plateau/ High Elevation Forests</p>	15	MOD	<ul style="list-style-type: none"> • Moderate impact on timber, water and First Nations culturally important plants. • Significant issues for some habitats and fish populations.
 <p>Cool / Wet High Elevation Forests</p>	21	MINOR-MOD	<ul style="list-style-type: none"> • Minor timber concerns long term – may be some short term benefits. • Minor concerns for habitat, except for Caribou • Significant concerns for water quality - may get increased peak flows and high intensity summer storms.

Possible Adaptive Actions

MANAGEMENT DIRECTION

1. Adaptive actions / direction



Planting different tree species.



Targeted Harvesting



Other Stand Treatments



Integrated Strategic Planning

What is next? – Follow-up K2 - 2009-2011

1. Explore and test sensitivities, adaptive options and assumptions by:
 - Working collaboratively with a local practitioners and experts using computer modeling and data analysis.



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