Appendix B - Assessing risk / identifying options

The impacts were assessed against the probability of the impact occurring and the consequences for a community if the impact occurred. The individual impacts were built into an assessment matrix, shown below, for both study areas. This information helped evaluate priority levels and provided a strong direction for the Steering Committee when drawing up action recommendations and subsequent priorities.

The arrows in the food matrix relate to the assessment of 'farming costs'. No firm decision could be reached on where it lay on the probability scale.

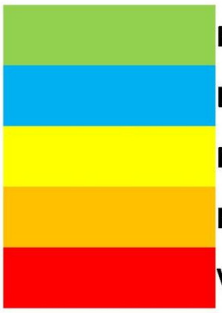
Probability assessment

Rating	Recurrent events	Single events
Almost certain	Could occur several times per year	More likely than not – probability greater than 50%
Likely	May arise about once per year	As likely as not – 50/50 chance
Possible	May arise once in the next five to ten years	Less likely than not but still appreciable. Probability less than 50% but still quite high
Unlikely	May arise once in the next 10-25 years	Probably not but still appreciable – probability low but noticeably greater than zero
Rare	Unlikely during the next 25 years	Negligible – probability very small, close to zero

Risk assessment

	Public safety	Environment	Community and lifestyle	Local economy and growth	Public Administration
Insignificant	Minor issues or shortfalls but of little or no concern to you or your community.				
Minor	Isolated cases but of no lasting nature. Mildly disruptive to some individuals or families.				
Moderate	Related issues will require a degree of attention. Some public knowledge or awareness. Inconvenience but no lasting damage will be felt by local community.				
Major	Issues would be in the public domain and would demand fairly urgent attention. Widespread but localized inconvenience might last a couple of days. Local communities would have to make alternative arrangements, working with other neighbours.				
Catastrophic	Breakdown in the chain of events, widespread concern and long-term damage to systems, lasting a period of weeks or months. Could alter immediate lifestyle for a period of time.				

Action assessment



Negligible- No action required

Low- Some actions (public education) may be desirable

Moderate- Some controls required to reduce risk to lower levels

High - High priority control measures required

Very High - Immediate controls required

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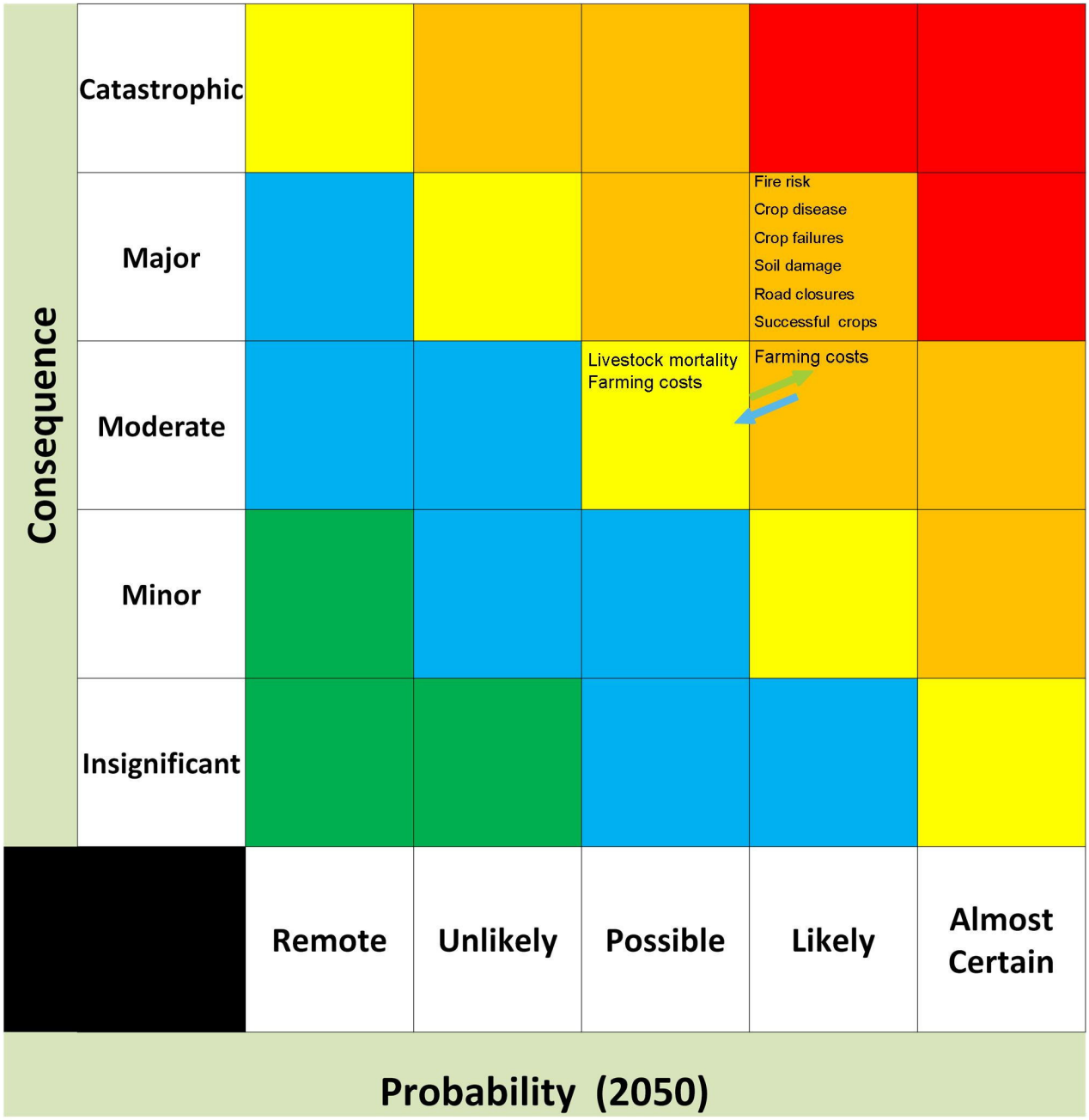
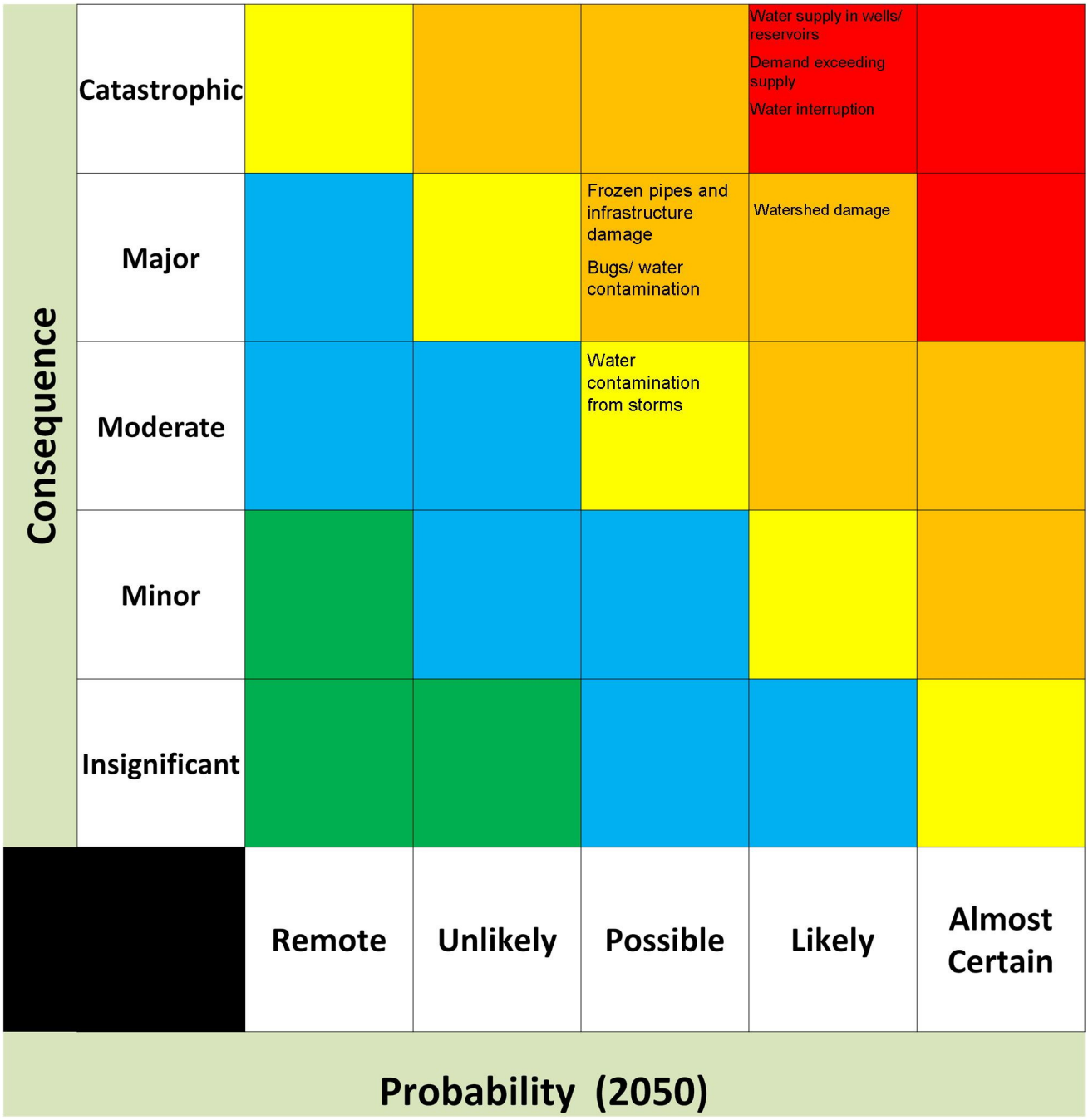
Risk Assessment Matrix

Food production



Risk Assessment Matrix

Water supply and quality



Risk Assessment of the identified climate related impacts
Once the climate related risks were identified, a risk assessment was carried out on each, again divided into water and food issues. The identified risks, plotted with respect to consequence and probability, are identified as below:

Very high risk (major consequence/almost certain probability): immediate controls needed
water - decreased water supply in wells and reservoirs, demand exceeding supply, water supply interruption
agriculture - none

High risk (major consequence, likely probability): high priority control measures required
water - watershed damage
agriculture - fire risks to crops and buildings, increased crop disease, reduced productivity, soil damage, road closures, successful crops

High risk (moderate consequence, possible probability): high priority control measures required
water - frozen pipes and infrastructure damage, water contamination from bugs/bacteria
agriculture - none

High risk (moderate consequence, likely probability): high priority control measures required
water - none
agriculture - increased farming costs

When considering how adaptable Kaslo/Area D was in terms of the projected risks, the following was produced:

Identifying options

Water Provision- Adaptation Options

	Climate-related Impact	**Risk** Very low Low Moderate High Very High	**Potential Adaptation Options:** What can be done?	**Adaptive Capacity:** Can we do it?
1.	Increase in air temperature, and reduced snowfall lead to ***reduced water supply in wells and reservoir*** (spring)	**Very High**	<u>Focus on supply</u> Deforestation – trees Watershed management Plot different species, higher temp tolerance, shade species Create wet land for recharge, storm management, filtration Higher dam Expand riparian buffers	**Low** Watershed management strategy Land managers cooperative (licensees, government, forestry) Very expensive, not very well spent.
2.	Reduced spring snowfall, Higher air temps, Increased growing degree days, Longer periods of little or no precipitation, lead to ***demand exceeding supply*** (spring, summer, fall)	**Very high**	<u>Focus on demand</u> Meters Low flush toilets Education (rainbarrels reduce water for lawn care, save $$ in treatment) Drip irrigation Xeriscaping Building code – graywater, compost Kaslo creek for golf course/gravity	**High** Incentive program Lower $$ than supply option $500 000 meter/toilet in each house Retrofit more expensive Difficult, cultural, new management **Low**
3.	Higher air temperatures and Increased extreme events lead to **increased watershed damage** (fall, winter, spring)	**High**	More buffer zones More vegetation More deciduous trees More sedimentation ponds More infiltration galleries	All can be done Very expensive **Low**

4. 4a	Increased occurrence of wind storms and intense rain events lead to **water contamination** (summer, winter) Bacteria = turbidity (???)	**Moderate** **high**	Biofilters Vegetated buffers Biowater (???) Wetlands (combined with above) Start tomorrow planning Minimise impervious surface No more pavement Household filters (POE)	Some easy Some hard Possible/practical Some resources **Moderate**
5.	Extreme rainfall events, increased occurrence of wind storms and snow storm frequency lead to power loss and **water supply interruption** (spring, summer, winter)	**Very high**	Backup system/standby power plant Alternative energy system/water system Redundancy (??) Underground power lines/utilities Wider right of ways/buffers Run of river – Kaslo river, need fish ladder	**Moderate** Possible Quite expensive $$ Possible, better in future, prices go up. Cost/kwh too low.
6.	Extreme cold events, decreased winter snowfall and less snow insulation lead to **water infrastructure damage** (frozen water pipes) (late fall, early winter)	**High**	Blow snow on pipes Bury deeper Permit stage – pipe burial depth minimum Water run in pipes	**High** Head thickness (barrier) Old pipes are leaking anyway. Dig up and bury deeper.

Agriculture - Adaptation Options

	Climate-related Impact	**Risk** Very low Low Moderate High Very High	**Potential Adaptation Options:** What can be done?	**Adaptive Capacity:** Can we do it?
1.	Increased air temperature, extreme conditions and lower summer rainfall, prolonged fire season lead to **increased fire risk to crops and buildings** (summer, fall)	**High**	Fire interface Fire smart-ing Emergency preparedness Incentives to enable upgrades	**High** Provincial $$ needed
2.	Increased air temperature, greater risk of bacteria and fungus lead to **increased crop disease** (fall)	**High**	Increase still set Crop rotation Diversify crops/seasonal Permaculutre/companion planting Bio-controls/not GMOs/biocides	**High** Education Enabling
3.	Reduced summer precipitation, decreased winter snowfall, increased severe rain storms lead to **reduced farm productivity, crop failure** (all seasons)	**High**	Increased storage/canning/dry Seed bank/increased production Greenhouses Drip irrigation/mulching	**Moderate** Expensive $$ Takes time More community based (**low - Andy)**
4.	Decreased winter snowfall, increased rainfall/ rainstorms, greater freeze depth potential lead to **damage and erosion** (winter, spring, summer)	**High**	Permaculture /landscape design Retention of soil/water preserving trees/plants Reforestation/slope stabilisation Catastrophic change (??)	**Moderate/high** Political Time $$
5.	Increased air temperature, strain on livestock lead to **livestock mortality** (summer)	**Moderate**	Non invasive livestock species Holistic livestock production	**High**

			Shade/water management	
6.	Increased occurrence in intense rain/snow storms, transportation disruptions lead to **road closures and produce shortages** (winter)	**High**	Increased food storage/production Emergency preparedness plan ---------- Snow cleaning budget ----------	Easy, not too many $$, No, needs leadership and $$
7.	Increased frost free days, increased bug survival, potential use of insecticides and pesticides lead to **higher farming costs**/ **land contamination** (All seasons)	**Medium**/ **High**	Share equipment Kootenay covers/greenhouses Financial incentives for agriculture etc infrastructure Catastrophic change	**Medium** With $ and support Leadership required
8.	Increased growing degree days lead to **broader range of successful crop varieties/more produce** (spring, summer)	**High**	Skills and knowledge Good Ministry of Agriculture Local initiatives eg KLAS Good crop genetics Sustainability not economic justification	**High** Already incentives in place to do these Present skills and research