

# Mitigation Options for Garry Oak/Trembling Aspen Ecosystem Disturbance at McKenzie Interchange



# Trembling Aspen ecosystem

Component	Indicator	Target	McKenzie Trembling Aspen Ecosystem Value
Tree layer	Average tree height	7-15m	9 m
	Canopy cover	70-95%	85%
	Average tree diameter (at 1.4 m)	10-20 cm	15.1 cm
	Species composition	At least 90% of trees are Trembling Aspen; at least 2 Oregon Ash trees.	99% Trembling Aspen; two Oregon Ash trees
		No non-native tree species present.	No non-native tree species
Shrub layer	Species composition	Common Snowberry is the most abundant species.	Common Snowberry is most abundant at 57%
		Secondary species may include a mix of one or more of the following: include Red Osier Dogwood, Twinberry, Nootka Rose, Pacific Crab Apple, Black Hawthorn, and Cascara	Secondary species include Red Osier Dogwood, Twinberry, Nootka Rose, Pacific Crab Apple, Black Hawthorn, and Cascara
		No non-native shrub species are present.	Oneseed Hawthorn, Spurge-laurel and Himalayan Blackberry present
	Cover	50-70%	50-70%
Herb layer	Species composition	Native species typical of Trembling Aspen ecosystems constitute >90% of the herb layer by cover during the spring growing season.	No observations during spring growing season but a dead foliage in the summer indicated the presence of a sparse herbaceous layer of native herbaceous species
		Non-native species constitute <10% of total herb cover during the spring growing season.	No observations during spring growing season but dead foliage suggested virtually no non-native herbaceous cover
	Cover	Foliar cover of herb layer about 5-30%	Foliar cover of herb layer about 10%
Moss/Lichen layer	Cover	< 5%	< 5%



# Garry Oak Ecosystem

Component	Indicator	Target	McKenzie Garry Oak Ecosystem Value
Tree layer	Average tree height	7-15m	11 m
	Canopy cover	50-90%	75%
	Average tree diameter (at 1.4 m)	15-40 cm	27.2 cm
	Species composition	At least 80% of trees are Garry Oaks.	86%
		No non-native tree species present.	No non-native tree species
Shrub layer	Species composition	Common Snowberry is the most abundant species.	Common Snowberry is most abundant at 62%
		Secondary species may include a mix of one or more of the following: Tall Oregon-grape, Ocean Spray, Nootka Rose, Indian Plum, Saskatoon	Secondary species include Tall Oregon grape, Ocean Spray, Nootka Rose Indian Plum and Saskatoon
		Other native shrubs may contribute up to 10% of total shrub cover.	Bitter Cherry at < 1%
		No non-native shrub species are present.	Oneseed Hawthorn, Spurge-laurel and Himalayan Blackberry present
	Cover	10-70%	<10%
Herb layer	Species composition	Native species typical of Garry Oak meadows or woodlands constitute >90% of the herb layer by cover during the spring growing season.	No detailed observations during spring growing season but a brief visit in spring verified the presence of a diverse herbaceous layer of native herbaceous species
		Non-native species constitute <10% of total herb cover during the spring growing season.	No observations during spring growing season
	Cover	In areas with dense shrubs, the herb layer may have a cover of as little as 5%.	Herb layer at 7% under dense shrubs or English Ivy
		In areas where the cover of the shrub layer is as little as 10%, the herb layer shall have a cover of at least 70% in order to exclude invasion by non-native species.	Herb layer at 20% on rock outcrops
Moss/Lichen layer	Cover	0-15%	Low coverage on rock outcrops

# Mitigation Process

## Environmental Values

Identify environmental values and associated components that will be impacted

Two values were identified: Garry Oak and Trembling Aspen ecosystems



## Hierarchy of Mitigation Options

Avoid > Minimize > Restore on site > Offset

Project needed for safety/traffic volume > Design footprint minimized > no restoration area on site > Offset



## Mitigation Plan

Quantify impact > Conservation mechanism > Cost

Restore similar local Garry Oak / Trembling aspen ecosystems in protected areas > \$1.45M

# Key Considerations

- Integration: The proposed restoration site will be integrated into the larger ecological landscape.
- Ecological Integrity: Threats to the proposed restoration site's health and integrity will be eliminated or reduced as much as possible.
- Resiliency: The proposed restoration site will be sufficiently resilient.
- Self-sustaining: The proposed restoration site will be self-sustaining.
- Location: Suitable sites should be within 15 km of the McKenzie Interchange.
- Cost-effective: Low cost (per unit area) restoration sites are preferable.
- Timely: Mitigation is not successful until target conditions have been reached.
- Certainty: High-risk restoration sites should be avoided.

# Identifying Potential Restoration Sites

## Review of Protected Areas

Municipal, Regional , Provincial and  
National Protected Areas

Develop long list of Protected Areas  
that may have matching ecosystems



## Seek Potential Partners

Contact Natural Areas Management Authorities

Determine level of interest  
Review and revise long list of potential restoration sites



## Assess Potential Restoration Sites

Conduct site visits

Assess site suitability  
Identify agency and site constraints  
Determine approximate restoration  
costs

# Potential Mitigation Sites

## Garry Oak Ecosystems

Site Name	Site Suitability	Cost	Cost/m <sup>2</sup>
Highrock Polygon	8.5: moderate	\$131,500	\$35.30
Oak Haven Park West	9: moderate	\$45,500	\$9.87
Summit Park South	10: high	\$90,120	\$90.57
Thetis Lake Park Entrance	7.0: low	\$39,000	\$15.75
Uplands Polygon 12, 15	11: high	\$82,950	\$32.67
Uplands Polygon 16	11: high	\$56,500	\$37.27
Uplands Polygons 17-18-19	10.5: high	\$57,225	\$10.69
Uplands Polygons 20-21-22	10.5: high	\$67,300	\$8.01
Uplands Polygon 39	11: high	\$90,000	\$39.63
Uplands Polygon 44	10.5: high	\$160,550	\$30.25
Uplands Polygon 45	11: high	\$71,750	\$11.28
Vic Derman Polygon 1	11: high	\$3,283	\$1.00
Vic Derman Polygon 2	11: high	\$37,650	\$12.50

# Capability Scoring

Highrock Municipal Park, Esquimalt Parks Department

The Highrock Polygon

- covers 3,725 m<sup>2</sup>
- consists of a mix of rock outcrops and deeper soil.

Forest Canopy = 3/4.

Shrub Layer = 1.5/2.

Herb Layer = 1.5/2.

Moss Layer = 1/1.

Adjacency = 1.5/2.

Total Rating = 8.5/11.

## Desired Restoration Outcome

There will be no invasive woody or semi-woody plants in the Highrock Polygon, and Common Snowberry will dominate the shrub layer, by the end of year 10.

Non-native herbaceous plants will constitute less than a 10% cover herbaceous plants in the Highrock Polygon by the end of year 10.



# Highrock Park Candidate Polygon



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