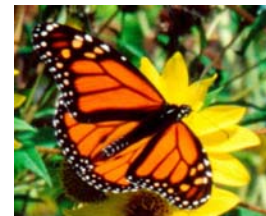# High Conservation Value Forest Toolkit & Thresholds
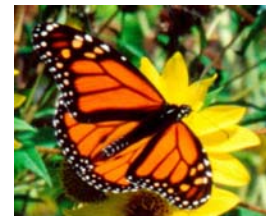
HCVF Support Document

- HCVF reporting still largely in a first generation phase

- Support document is an opportunity to communicate experience gained to improve future assessments

- Intended to be a companion to the HCVF Framework, not to replace or change guidelines

Intent of Document

- To provide additional guidance to interpret HCVF thresholds

- To provide guidelines to ensure more consistent application of the HCVF framework

- To offer additional methods and analytical techniques to help identify, map and assess HCVs

- To more clearly define the role of HCVF assessments in the larger context of conservation planning

Schedule

- Document is still in development
- Opportunities for input on approaches, methodologies and thresholds
- Document will undergo a peer review
- Drafts will be available for comment until late summer, 2005
- The final product will be publicly available via our FTP site initially, and eventually our website
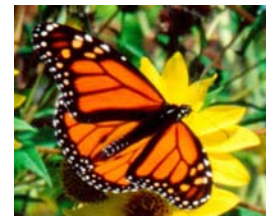
General Document Structure

Modular format consisting of:

1. ## Overview Document

   - Broader, overarching issues which apply to all HCVF framework questions (*e.g.* issues of scale, the precautionary principle, the role of HCVF in conservation planning)

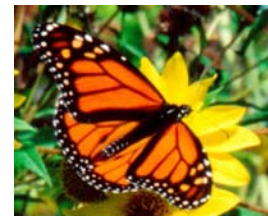2. ## HCV 'Fact Sheets'

   - Series of documents which correspond to each of the HCVF framework questions

   - Provide more detailed rationale, approaches, thresholds and examples to be used in conjunction with existing guidance
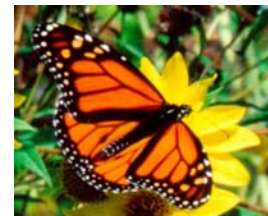
HCVF Assessment Examples

- ## Purpose
  - Provide a backdrop for discussion on approach and threshold interpretation

- ## Study Area
  - Utilized NE Ontario and NW Quebec (Terrestrial Ecoregions of Canada 96 & 97) for case studies
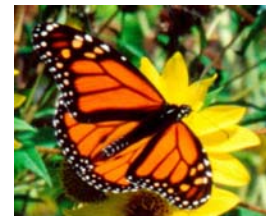
HCV1 Q1
Species at Risk

Analytical Approach

- Analysis largely based on identification of species of concern that exist within the tenure (e.g. At Risk or Range Edge)

- Assisting practitioners to generate a "first pass" list of species consulting the WWF HCV1 database and other sources

- HCV1 database presently includes COSEWIC, IUCN and WWF-Canada's Nature Audit (2003) species data

- Future iterations may include NatureServe G-, N- and S-Ranks

Analytical Approach

- Sample output of Species at Risk for Ecoregion 96 (Abitibi Plains)

WWF-Canada HCV1 Species Database

Search Filters (19 Records)

96 Abitibi Plains | Species At Risk

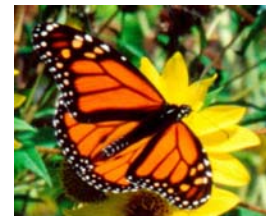| Summary	Species at Risk	Taxonomic Group	Nature Audit	COSEWIC	NatureServe	IUCN
HCV	PEREGRINE FALCON ANATUM SUBSPECIES (FALCO PEREGRINUS)	BIRDS		HCV		
HCV	DEEPWATER SCULPIN (MYOXOCEPHALUS THOMPSONI)	FRESHWATER FISHES		HCV		
HCV	SHORTJAW CISCO (COREGONUS ZENITHICUS)	FRESHWATER FISHES		HCV		Possible
HCV	WOLVERINE (GULO GULO)	MAMMALS	Possible	HCV		Possible
HCV	WOODLAND CARIBOU (RANGIFER TARANDUS)	MAMMALS		HCV		
HCV	BOG ADDER'S-MOUTH (MALAXIS PALUDOSA)	VASCULAR PLANTS	HCV			
HCV	NORTHERN TWAYBLADE (LISTERA BOREALIS)	VASCULAR PLANTS	HCV			
HCV	HOOKER ORCHIS (PLATANTHERA HOOKERI)	VASCULAR PLANTS	HCV			
Possible	MONARCH (DANAUS PLEXIPPUS)	ARTHROPODS		Possible		
Possible	OLIVE-SIDED FLYCATCHER (CONTOPUS COOPERI)	BIRDS	Possible			Possible
Possible	LESSER YELLOWLEGS (TRINGA FLAVIPES)	BIRDS	Possible			
Possible	CANADA WARBLER (WILSONIA CANADENSIS)	BIRDS	Possible			
Possible	BAY-BREASTED WARBLER (DENDROICA CASTANEA)	BIRDS	Possible			
Possible	YELLOW RAIL (COTURNICOPS NOVEBORACENSIS)	BIRDS		Possible		
Possible	KIYI (COREGONUS KIYI)	FRESHWATER FISHES		Possible		Possible
Possible	NORTHERN BROOK LAMPREY (ICHTHYOMYZON FOSSOR)	FRESHWATER FISHES		Possible		
Possible	EASTERN WOLF (CANIS LUPUS)	MAMMALS		Possible		
Possible	GREEN-FRINGE ORCHIS (PLATANTHERA LACERA)	VASCULAR PLANTS	Possible			
Possible	SWAMP-PINK (ARETHUSA BULBOSA)	VASCULAR PLANTS	Possible			

Analytical Approach

- WWF's HCV1 database provides guidance towards generation of a comprehensive candidate species list

- Species listed likely occur within the ecoregion, but not necessarily in your tenure

- There is a need for local assessment of presence and status of each candidate species

- Reports should address the status of each HCV1 candidate species potentially occurring in the license area, and provide a rationale for its final determination as HCV or not
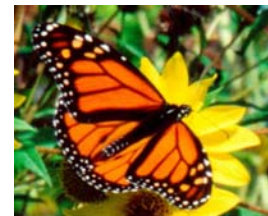
Proposed HCVF Design Guidelines

- Current WWF HCV1 candidate species lists based on COSEWIC, IUCN and Nature Audit data

- *COSEWIC Rank HCV Guidance designations*:
  - Likely HCV – Any taxa listed as **Threatened**, **Endangered** or **Extirpated**
  - Possible HCV – Any taxa listed as **Special Concern**

- *IUCN Rank HCV Guidance designations*:
  - Likely HCV – Any taxa listed as **Critically Endangered** or **Endangered**
  - Possible HCV – Any taxa listed as **Vulnerable, Near Threatened, or Lower Risk (all categories)**

Proposed HCVF Design Guidelines

- ## *Nature Audit HCV Guidance designations:*
  - Utilized current **Range** and **Abundance**, and estimated **Trends from Pre-European Settlement** data

		ABUNDANCE TREND FROM 1600 TO 2000				
		Decreased > 50%	Decreased > 20%	No Change (± 20%)	Increased > 20%	Increased > 50%
ABUNDANCE IN 2000	Abundant	🟨				
	Common					
	Uncommon	🟧	🟨			
	Rare	🟧	🟧	🟨	🟨	🟨

🟧 **Likely HCV**
🟨 **Possible HCV**
🟩 **Unlikely HCV**

		RANGE TREND FROM 1600 TO 2000				
		Contracted > 50%	Contracted > 20%	No Change (± 20%)	Expanded > 20%	Expanded > 50%
RANGE EXTENT IN 2000	Widespread	🟨				
	Regional	🟨				
	Restricted	🟧	🟨			
	Very Restricted	🟧	🟧	🟨	🟨	🟨
	Extirpated	HCV – Habitat Restoration				

Proposed HCVF Design Guidelines

- *Summary Nature Audit HCV Guidance designation*:

		ABUNDANCE DESIGNATION		
		HCV	Possible HCV	Not HCV
RANGE DESIGNATION	HCV	Likely HCV	Likely HCV	Possible HCV
	Possible HCV	Likely HCV	Possible HCV	Unlikely HCV
	Not HCV	Possible HCV	Unlikely HCV	Unlikely HCV

Legend:
- Likelv HCV (orange)
- Possible HCV (yellow)
- Unlikely HCV (green)

- Overall HCV Recommendation was taken to be the highest rank assigned by the data sources consulted (*i.e.* Nature Audit, IUCN and COSEWIC)
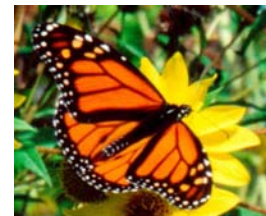
Analytical Approach to define HCVF zones in relation to HCV's

- **<u>Example of a species with well defined natural history requirements</u>:** Wood turtle (*Clemmys insculpta*)

- Wood turtle is present in the ecoregion, and is a possible HCV, as per COSEWIC and IUCN rankings

- Presence & status on a particular tenure requires further investigation

Analytical Approach for Wood Turtle

- Consult range maps (various sources):
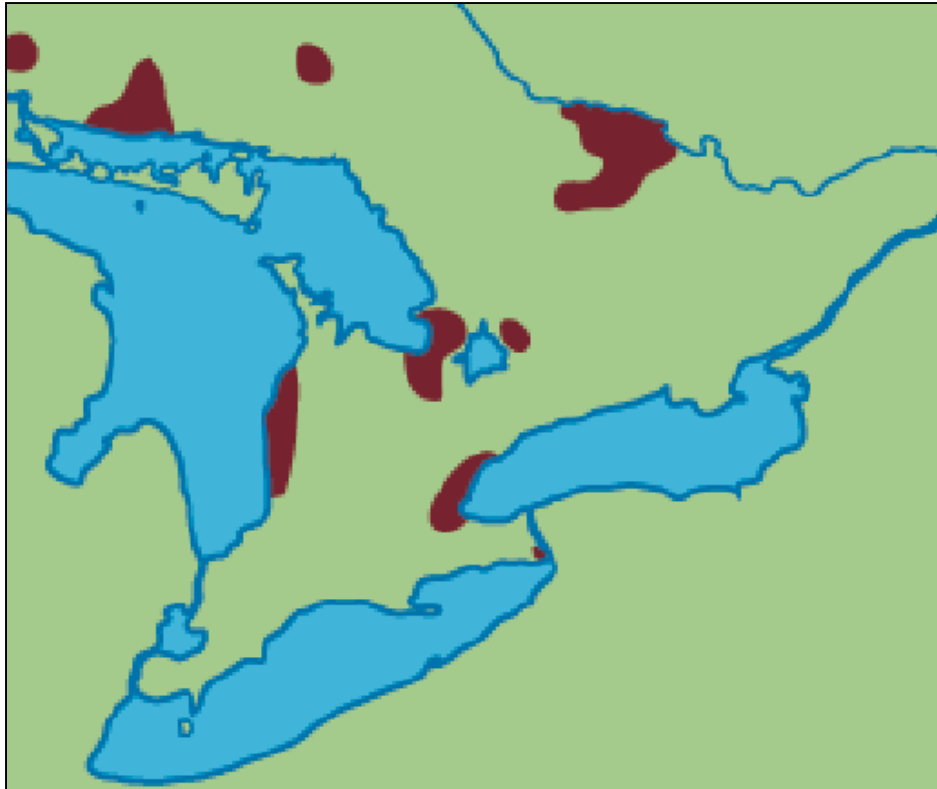
- Known wood turtle range overlaps the tenure in question

- Species is tracked by NHIC, so element occurrence data can be used to augment the range map

Proposed HCVF Design Guidelines

- Element occurrence (EO) data indicates presence in a watershed which intersects the tenure, but not in the tenure itself

- Absence of EO data does not mean absence of the element – must investigate the *potential* distribution
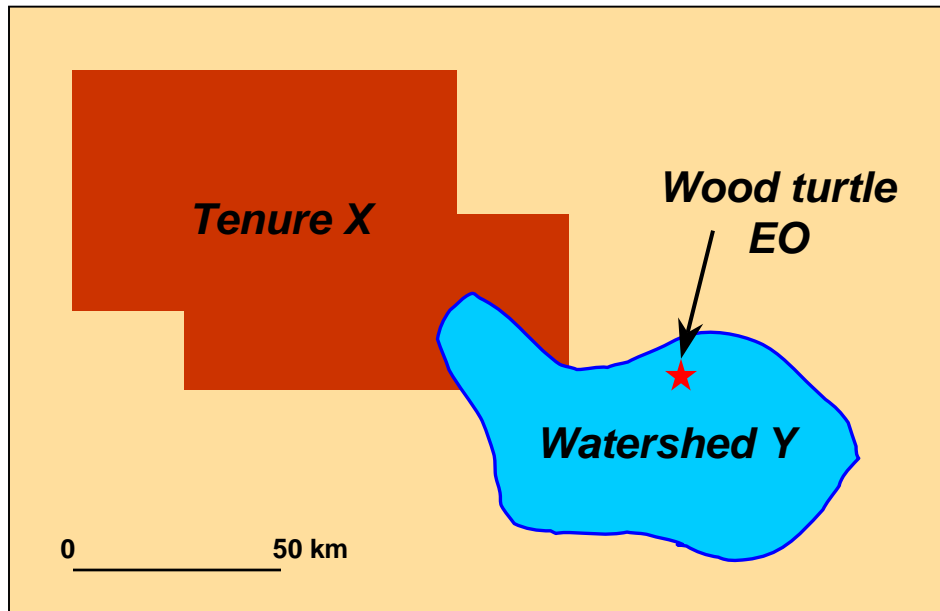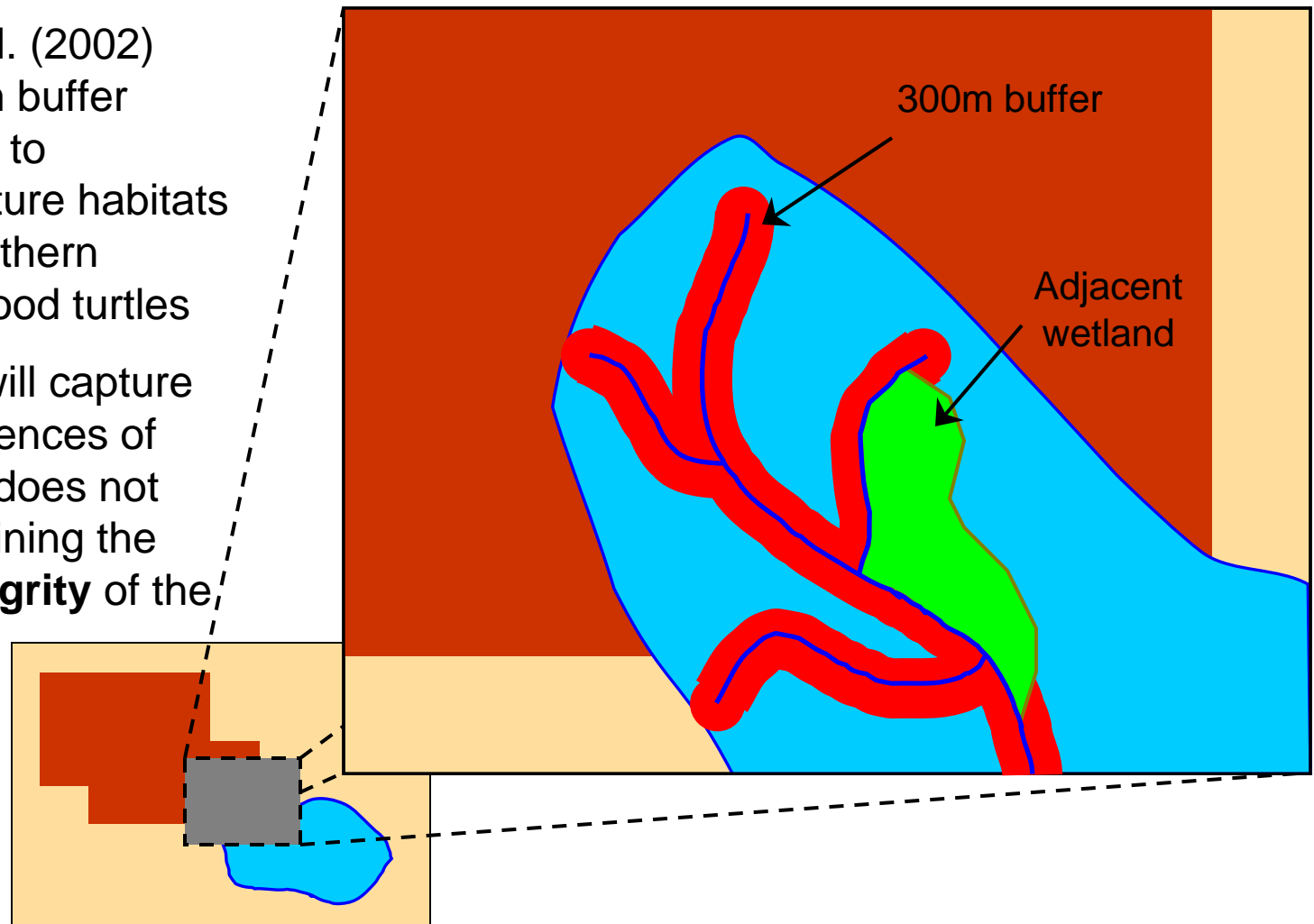

- Under the precautionary principle, wood turtle should be identified as a potential HCV in the portions of Watershed Y overlapping Tenure X
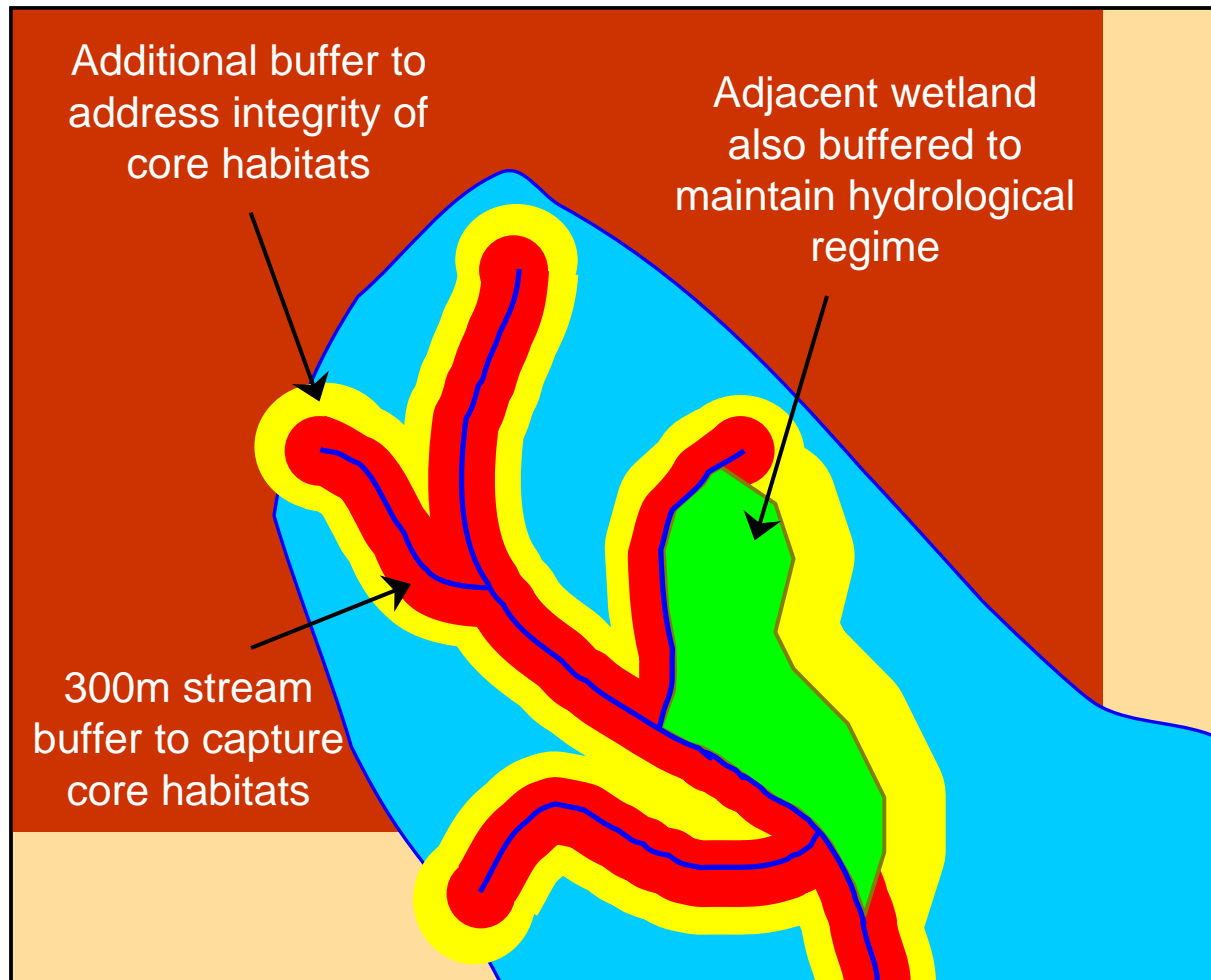
Proposed HCVF Design Guidelines

- *Identification of a mappable wood turtle HCVF Zone*

- Arvisais et al. (2002) suggest a 300m buffer around streams to adequately capture habitats utilized by a northern population of wood turtles

- This buffer will capture potential occurrences of wood turtle but does not address maintaining the **ecological integrity** of the site

300m buffer

Adjacent wetland

Proposed HCVF Design Guidelines

Additional buffer to address integrity of core habitats

Adjacent wetland also buffered to maintain hydrological regime

300m stream buffer to capture core habitats

- All streams, wetlands and buffers considered possible HCVFs

- HCVF management options might include:

  - No roads in 300m core buffers; careful consideration of roads in yellow buffers

  - No roads or other activity in wetlands or adjacent areas that could alter hydrological conditions

  - Low intensity seasonal harvesting within red buffers provided forest composition maintained

Analytical Approach

- **Example of a species with less well defined natural history requirements and/or knowledge of its population distribution:** Bog adder's mouth (*Malaxis paludosa*)
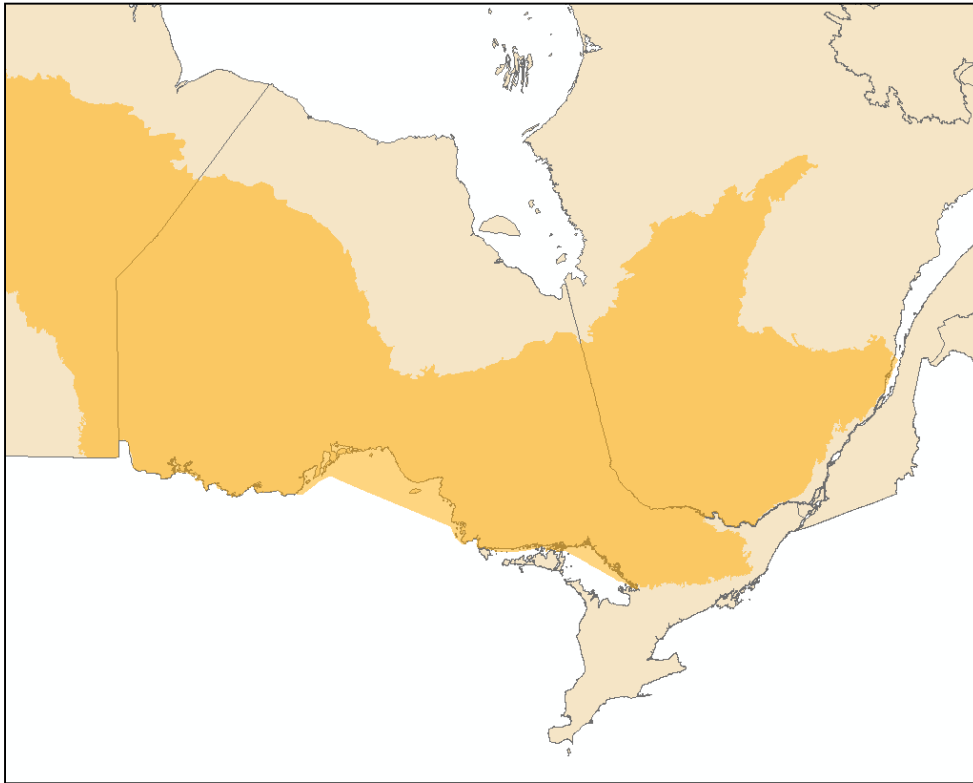

- Bog adder's mouth is likely present in the ecoregion, and is listed as HCV, as per Nature Audit data and NatureServe (listed as S1 in Ontario)

- Presence & status on a particular tenure requires further investigation

Analytical Approach

- Consult range maps:

- Potential range of the orchid in Canada overlaps the tenure in question, but the range mapping is very coarse.

- Actual population occurrences within the shaded range will be much more restricted to suitable habitat.

Analytical Approach

- There are no known occurrences in the tenure, but this is an inconspicuous bog species and there has likely been low search effort

- The precautionary principle would lead us to map potential suitable habitat of bog adder's mouth based upon known ecological requirements:

    - Bogs and fens, which are open or partially shaded by black spruce, balsam fir or eastern white cedar (Royal Botanical Gardens, www.osrgb.ca)

Proposed HCVF Design Guidelines

- *Identification of potential wetland habitats suitable for bog's adder mouth*
  - e.g. all open and treed bogs mapped (derived from Landcover 2000)
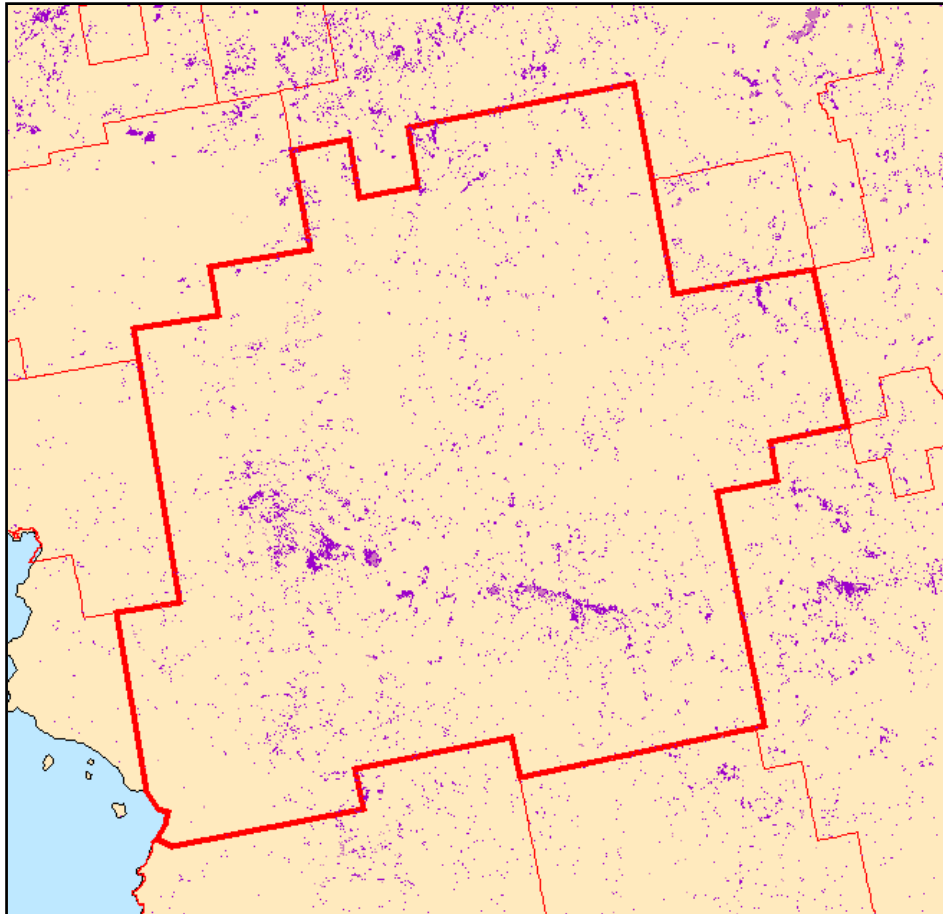
Proposed HCVF Design Guidelines

- Working through the listed species, several are found to have similar habitat requirements

Proposed HCVF Design Guidelines

- ***Conclusions:***

  - Under the precautionary approach, wetlands in this tenure are all possible HCVF's.

  - As management plans are developed, wetland habitats in the vicinity of proposed activities should be surveyed for potential HCV values.

  - Results should inform the management planning process of any required modifications to plans before they are finalized or amended.

Analytical Approach

- **Edge of Range Species Example:** Eastern hemlock (*Tsuga canadensis*)

WWF-Canada HCV1 Species Database	
Search Filters (16 Records)	
97 Lac Temiscamingue Lowland	Edge of Range (Tree Species)
Species at Range Edge	**Taxonomic Group**
SUGAR MAPLE (ACER SACCHARUM)	VASCULAR PLANTS
LARGETOOTH ASPEN (POPULUS GRANDIDENTATA)	VASCULAR PLANTS
HOP-HORNBEAM (OSTRYA VIRGINIANA)	VASCULAR PLANTS
YELLOW BIRCH (BETULA ALLEGHANIENSIS)	VASCULAR PLANTS
BUR OAK (QUERCUS MACROCARPA)	VASCULAR PLANTS
RED OAK (QUERCUS RUBRA)	VASCULAR PLANTS
EASTERN HEMLOCK (TSUGA CANADENSIS)	VASCULAR PLANTS
STAGHORN SUMAC (RHUS TYPHINA)	VASCULAR PLANTS
RED (GREEN) ASH (FRAXINUS PENNSYLVANICA)	VASCULAR PLANTS
SILVER MAPLE (ACER SACCHARINUM)	VASCULAR PLANTS
RED MAPLE (ACER RUBRUM)	VASCULAR PLANTS
STRIPED MAPLE (ACER PENSYLVANICUM)	VASCULAR PLANTS
BASSWOOD (TILIA AMERICANA)	VASCULAR PLANTS
ALTERNATE-LEAF DOGWOOD (CORNUS ALTERNIFOLIA)	VASCULAR PLANTS
WHITE ASH (FRAXINUS AMERICANA)	VASCULAR PLANTS
WHITE ELM (ULMUS AMERICANA)	VASCULAR PLANTS

- Eastern hemlock is at its range edge in the ecoregion

- Presence & status on a particular tenure requires further investigation

- Hemlock has declined in many parts of range; can be difficult to regenerate

Analytical Approach

- Consult range maps:
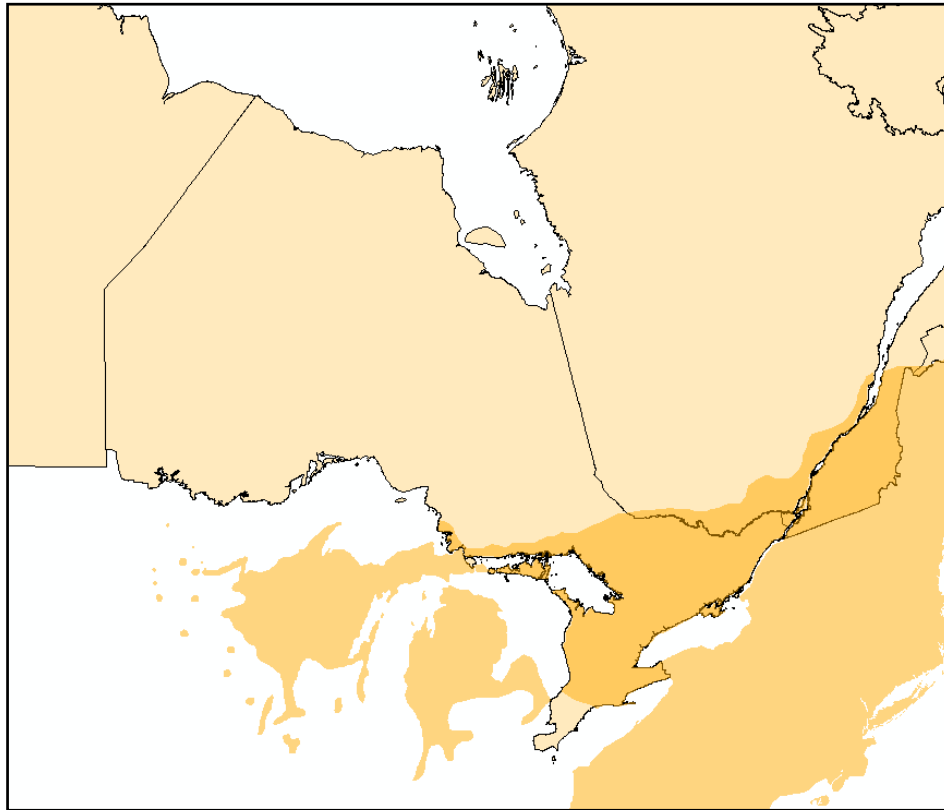
- The tenure in question is at the northern range edge of eastern hemlock, according to generalized range maps

Proposed HCV Guidance Thresholds

- *Mapping of FRI stands containing eastern hemlock*
  - All stands containing eastern hemlock estimated to be within 100 km of the generalized range edge are considered HCVFs
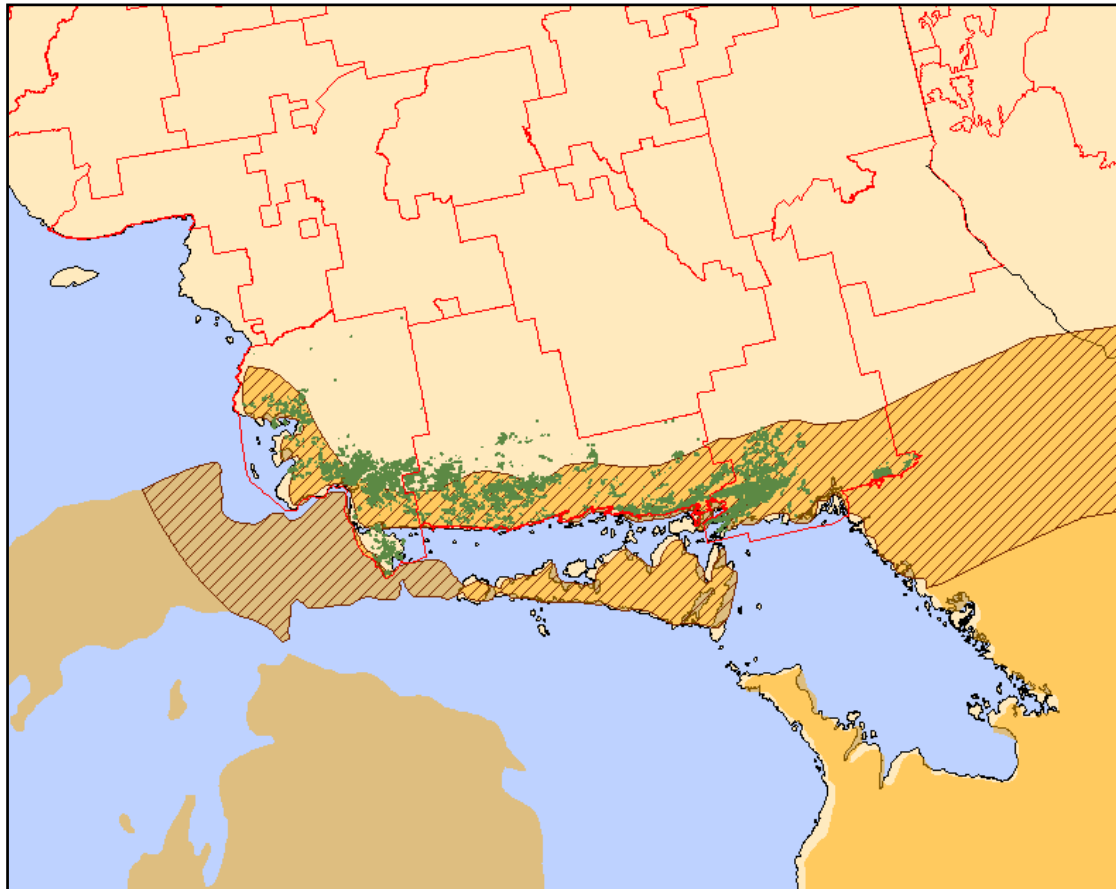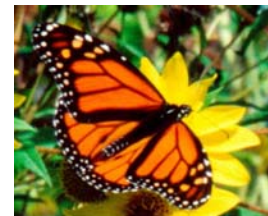
HCV2 Q7
Large Landscape Level Forests

Analytical Approach

- Intent is to identify large, relatively intact contiguous forest, with high level of habitat quality

- We suggest two approaches:

1. Mapping forest blocks that are free of permanent infrastructure, and then assessing non-permanent disturbance and indicators of forest quality

2. Use watersheds as the geographic unit of analysis to determine levels of disturbance and forest quality

Analytical Approach: *Forest Blocks*

- Forest landscapes free of permanent infrastructure:
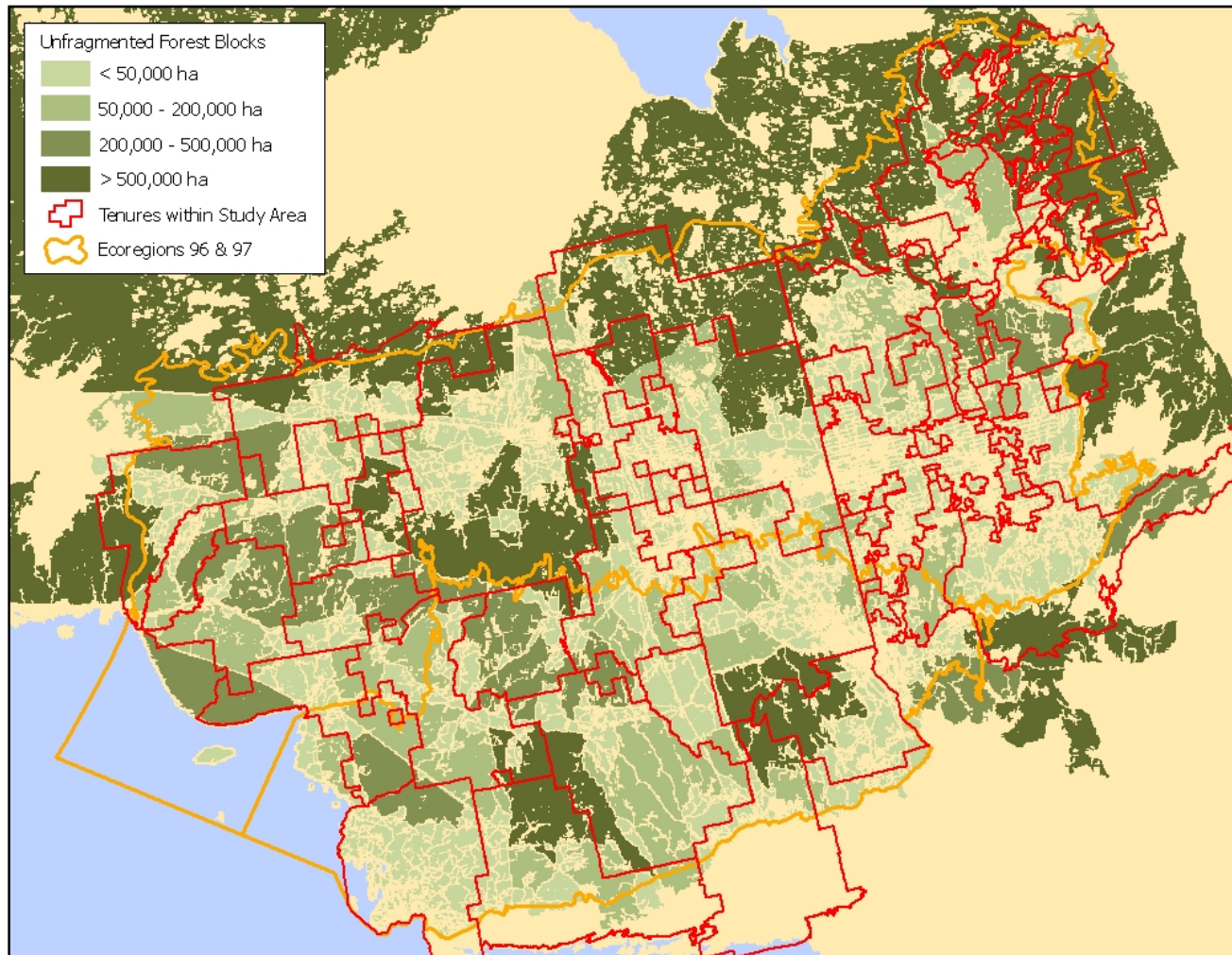
HCV Guidance Thresholds

- ***Forest quality within forest blocks:***
  - < 5% disturbance, > 30% late seral

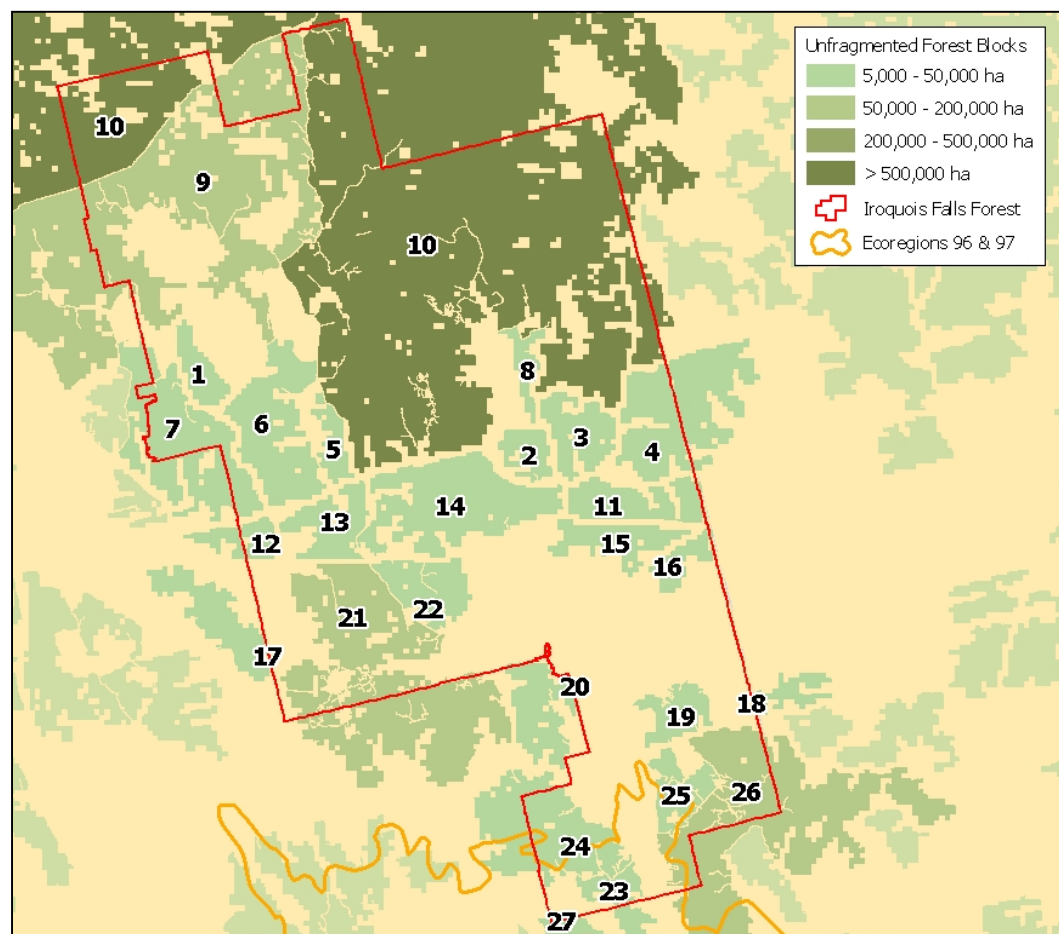| Block ID	Area of Block within Tenure (ha)	Total Block Size (ha)	Prop. of Non-Permanent Disturbance within Tenure	Prop. of Late Seral Stands
LLLF 1	7,710	7,710	0.1%	17.5%
LLLF 2	6,755	6,755	30.4%	12.6%
LLLF 3	13,717	13,717	28.3%	10.0%
LLLF 4	19,032	40,180	0.7%	5.2%
LLLF 5	5,851	5,851	20.0%	4.4%
LLLF 6	30,253	30,253	12.3%	12.1%
LLLF 7	22,402	42,215	11.4%	10.8%
LLLF 8	5,314	5,314	57.6%	10.9%
LLLF 9	86,968	170,091	18.6%	34.2%
LLLF 10	320,157	2,561,259	12.9%	25.5%
LLLF 11	15,069	15,362	2.5%	1.1%
LLLF 12	3,937	7,166	1.4%	8.6%
LLLF 13	12,720	12,720	10.5%	15.0%
LLLF 14	40,723	40,723	2.1%	9.2%
LLLF 15	12,160	12,160	13.7%	3.6%
LLLF 16	5,860	5,989	6.1%	2.2%
LLLF 19	9,356	9,356	6.3%	5.2%
LLLF 20	546	15,908	28.5%	32.0%
LLLF 21	43,254	85,246	15.3%	12.3%
LLLF 22	14,590	14,590	11.9%	15.7%
LLLF 23	5,060	11,789	11.1%	0.7%
LLLF 24	20,159	36,452	28.5%	6.9%
LLLF 25	9,996	9,996	22.1%	5.3%
LLLF 26	25,767	83,490	16.5%	5.0%
LLLF 27	491	8,034	7.0%	14.3%

Analytical Approach: *Watersheds*

- Use watersheds as base unit of analysis
- Identify contiguous watersheds whose levels of disturbance and quality meet thresholds and assess total size for regional, national or global significance

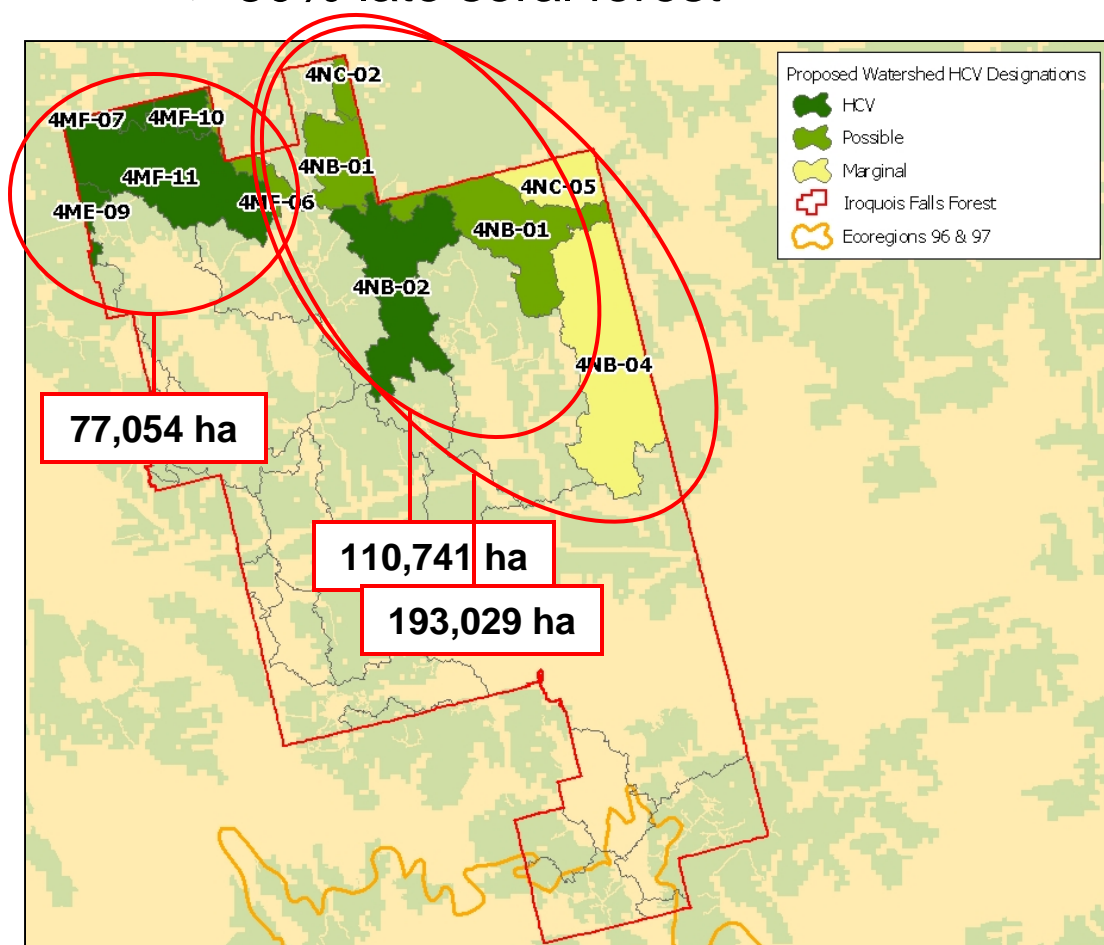# HCV Guidance Thresholds

- *Forest quality within watersheds*:
 - < 5% non-perm disturbance, < 0.03 km/km^2 perm infrastructure, > 30% late seral forest

Block ID	Area of Block within Tenure (ha)	Density of Permanent Disturbance within Tenure (km/km^2)	Prop. of Non-Permanent Disturbance within Tenure	Prop. of Late Seral Stands
4MA-01	244,219	0.28	11.1%	4.5%
4MA-02	59,034	0.34	12.2%	6.3%
4MA-03	44,873	0.19	5.7%	10.1%
4MA-04	26,292	1.02	15.6%	3.0%
4MA-05	37,950	0.54	21.8%	4.8%
4MB-01	25,842	0.61	24.2%	4.3%
4MB-03	4,248	0.53	33.0%	0.0%
4MB-05	13,236	0.46	22.4%	7.1%
4MC-01	41,757	0.64	29.0%	5.4%
4MC-03	6,576	0.44	9.1%	13.8%
4MC-04	31,436	0.29	10.8%	11.7%
4MC-05	10,080	0.37	3.1%	11.0%
4MC-07	16,314	0.46	27.8%	16.0%
4MC-08	51,905	0.25	13.6%	13.2%
4ME-09	3,795	0.10	5.3%	40.3%
4ME-15	6,917	0.20	38.9%	22.5%
4ME-16	109,186	0.28	36.8%	17.9%
4ME-17	63,953	0.24	32.3%	17.4%
4MF-06	7,345	0.08	8.2%	20.3%
4MF-07	2,786	0.00	0.0%	37.0%
4MF-09	161	0.00	0.0%	28.9%
4MF-10	6,308	0.12	0.0%	33.7%
4MF-11	56,820	0.06	3.0%	37.4%
4NB-01	59,828	0.03	12.1%	38.0%
4NB-02	46,728	0.04	6.0%	30.8%
4NB-03	101,997	0.30	34.4%	17.9%
4NB-04	66,941	0.11	8.4%	16.3%
4NC-01	16,083	0.27	25.9%	17.2%
4NC-02	4,185	0.08	5.8%	25.3%
4NC-05	15,347	0.00	13.2%	17.9%

HCV Guidance Thresholds

- The summed areas of both methods will give a final HCVF zone, and the areas identified by both approaches will be flagged as being of prime importance on the landscape

- Combining the two approaches will give a more comprehensive view of Large Landscape Level Forests:

Legend:
- Areas Identified by Both Methods
- Areas Identified by One Method
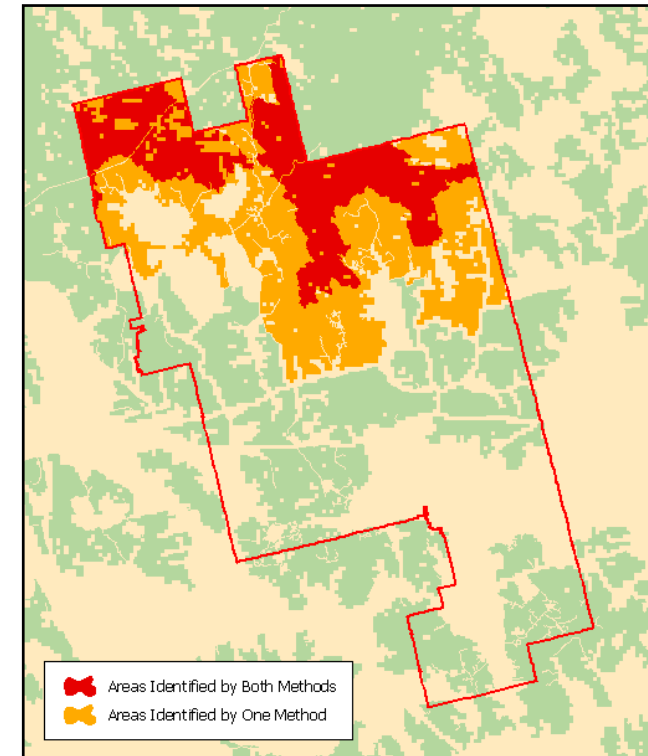
- *Forest Block Approach*
  - Will capture large blocks of contiguous forest cover, within acceptable thresholds for quality and disturbance

- *Watershed Approach*
  - Will capture high quality areas even if there is some dissection by permanent corridors
  - Utilizes ecologically functional units in the landscape
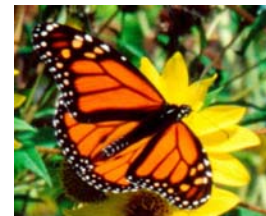
HCV3 Q8/11
Rare, Unique or Diverse Ecosystems
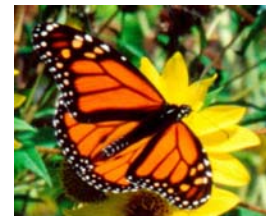
Analytical Approach

- Q8 and Q11 dealt with as a single problem, with a different scale of relevance:

- Q8 aimed at identifying ecosystems that are nationally and globally rare, threatened or endangered
  - Analyses more "list-based"

- Q11 aimed more at identifying more regionally rare or unique ecosystems
  - Analyses based more in local knowledge

Analytical Approach

- General issues in identifying "rare" ecosystems:

1. Lack of spatial analysis
   - Mapping of ecosystems commonly omitted from HCVF reports
2. Lack of data
   - Classifications of rare ecosystems often don't exist – proxies are needed
3. Scale
   - Rarity is scale dependent and must be assessed at regional, national and global levels

Analytical Approach

- Where **classifications exist** and there is appropriate data spatial data available, rare ecosystems should be mapped directly

  - *e.g.* red pine/white pine dominated stands (G3G4) can be mapped directly from FRI (SFU = Pw/Pr)

  - *Issue*: This does not address potential distribution. There is a need for predictive mapping.
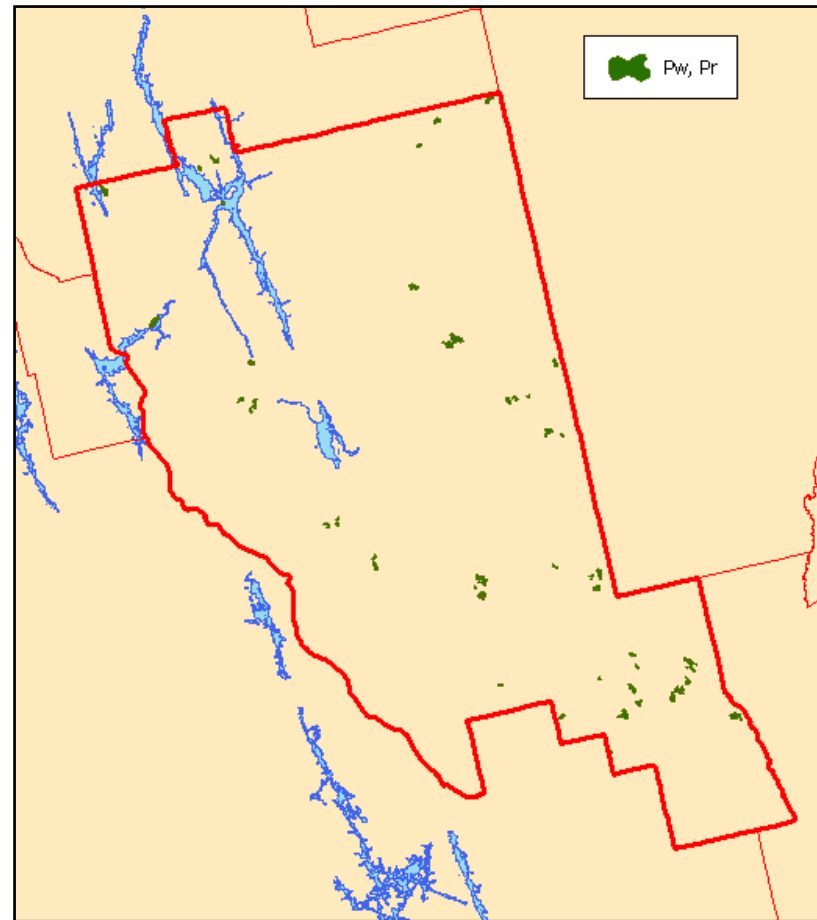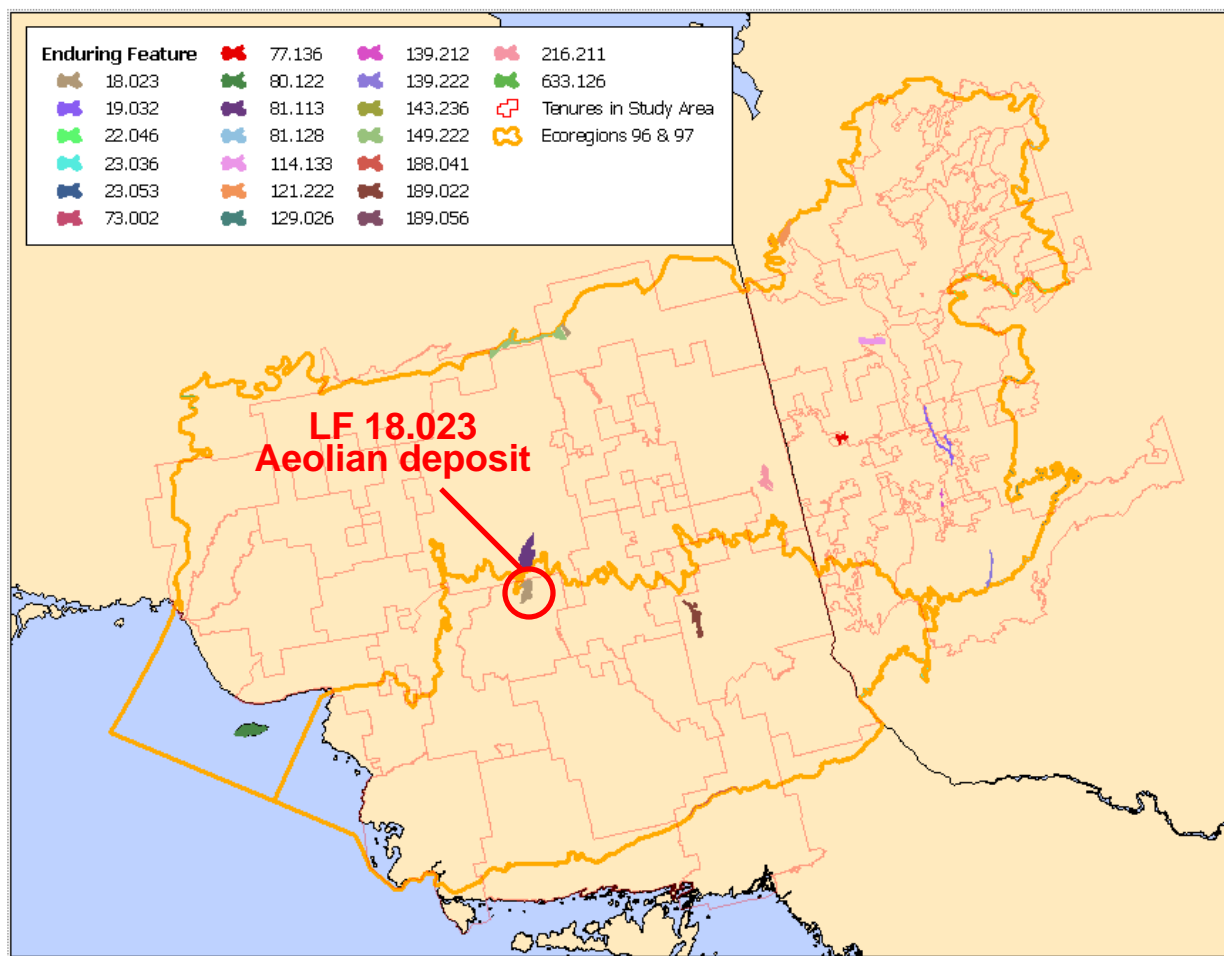
HCV Guidance Thresholds

- Where **classification does not exist** for rare ecosystems, proxies representing ecological parameters need to be utilized (*e.g. OMNR* landform-veg, soils, geologic data)
  - The "tail" of the frequency distribution of proxy data is the starting point for rare ecosystem identification

Frequency Distribution of Enduring Features

Rarest Quartile

Total Area
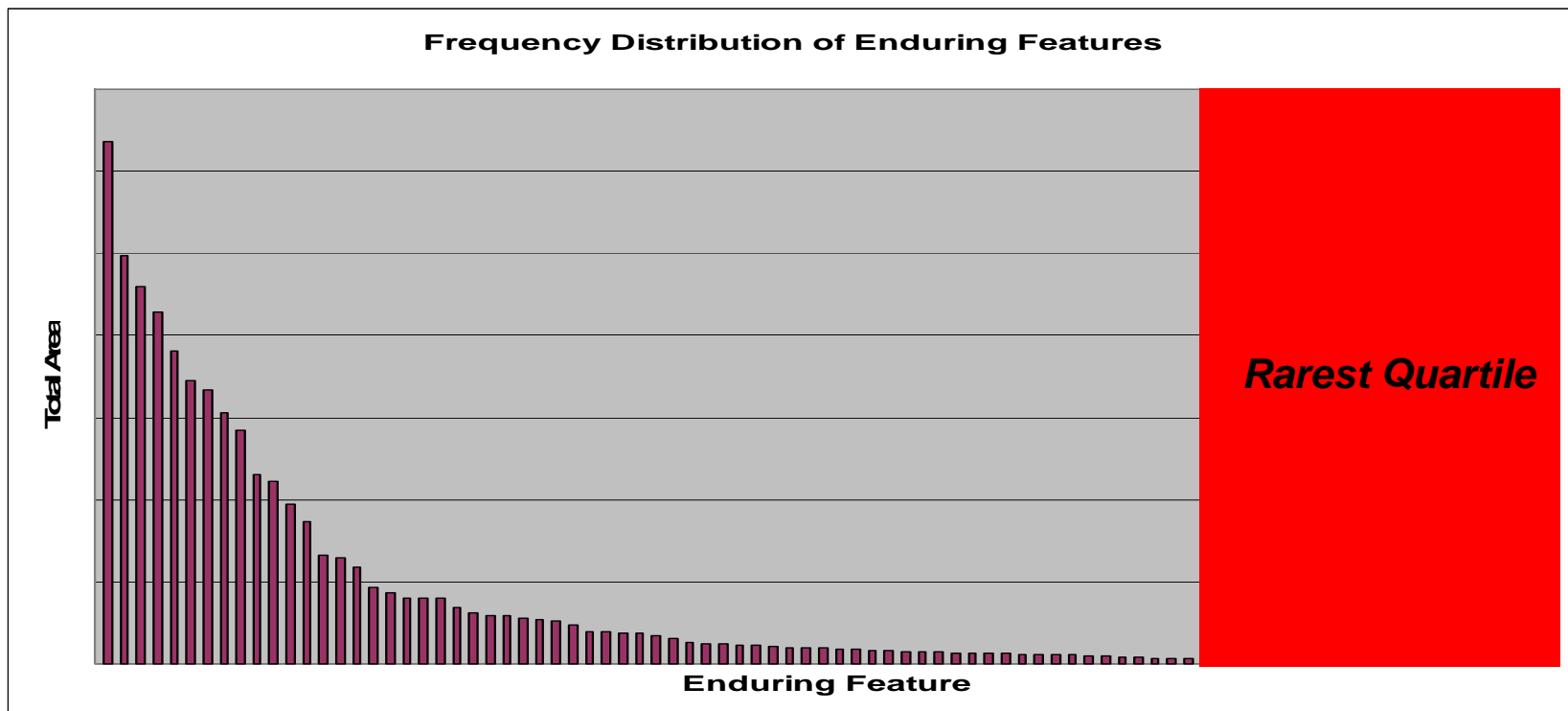
Enduring Feature

HCV Guidance Thresholds

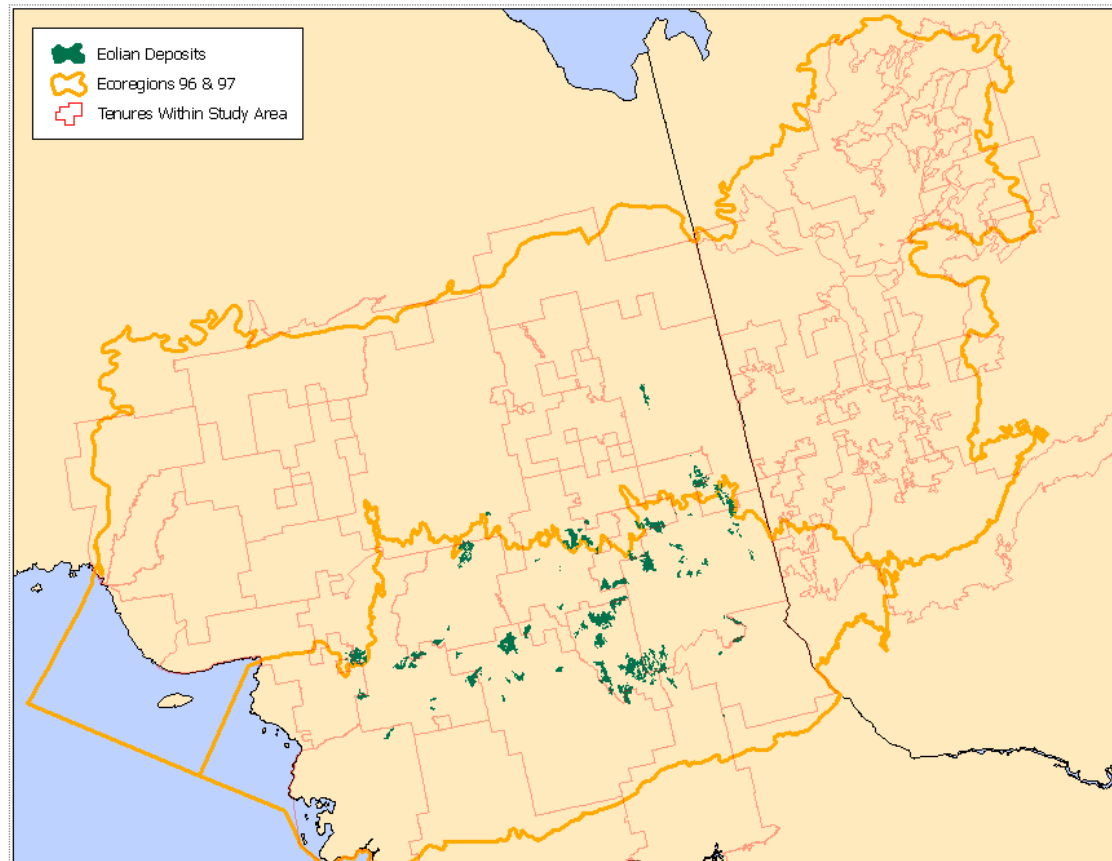- *Rarest quartile* of enduring features by area (coarse-scale, 1:1M data) identified 22 features
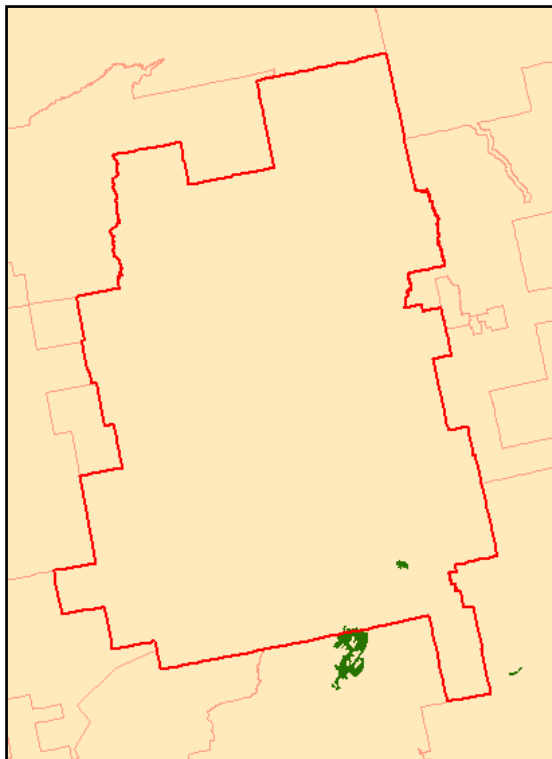
HCV Guidance Thresholds

- Aeolian features investigated further using finer scale NOEGTS data (1:100K)
    - Identified more areas that are dominated by aeolian deposits
    - Still regionally rare, distribution is patchy and significantly clustered over study area
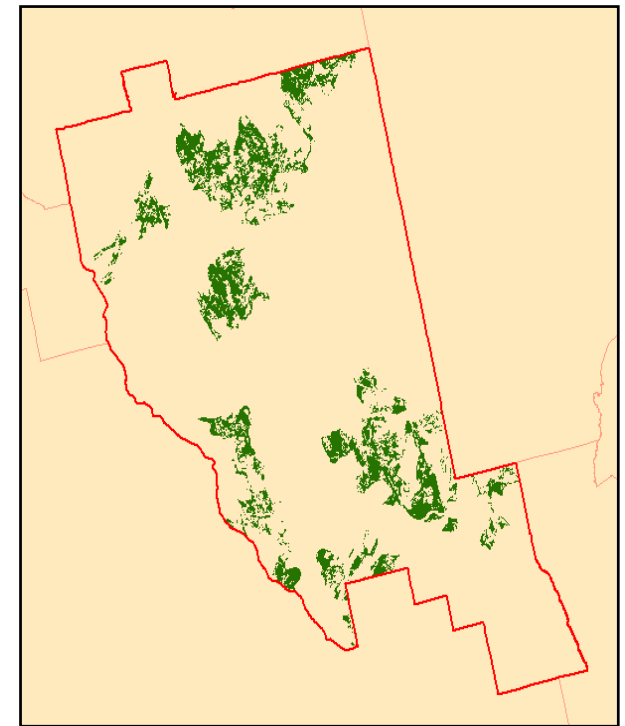
HCV Guidance Thresholds

- Given regional rarity, occurrences in all tenures should be considered for HCV status

- Because of patchy distribution, the questions now become:

  - **What proportion of the occurrences should be designated HCVs?**

  - **Which particular occurrences should be selected?**
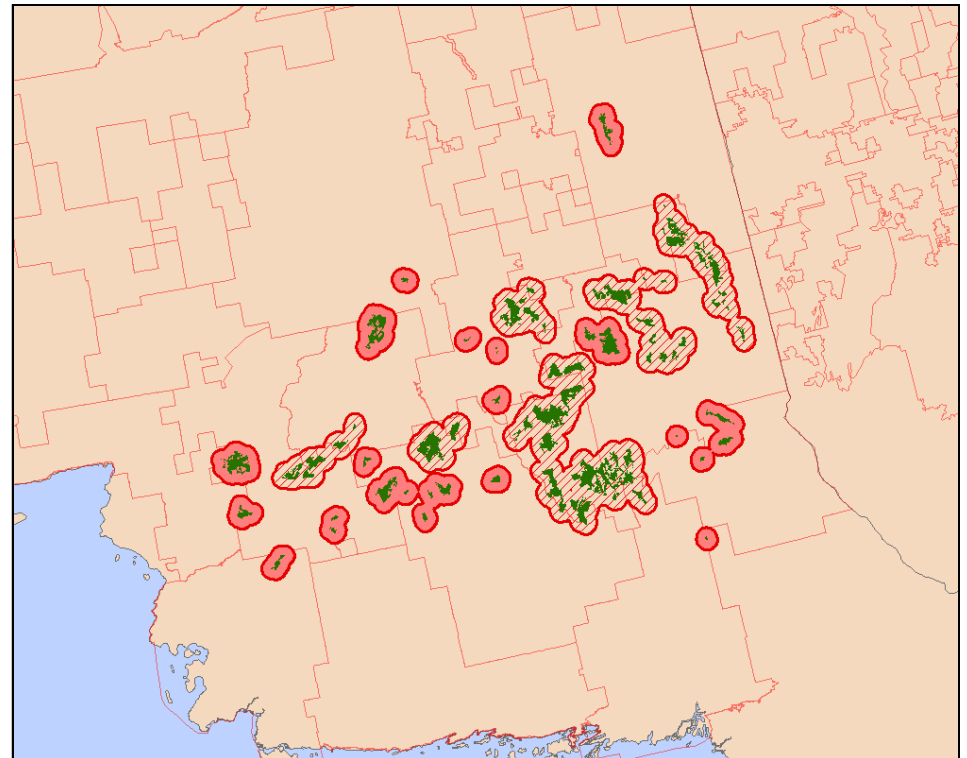
HCV Guidance Thresholds

- Two potential methods for identifying proportion to be captured as HCVF

1. Set an *a priori* regional goal based on conservation rationale such as:
- Overall rarity of feature
- Compositional and topographic heterogeneity of patches
- Geographic distribution of patches

Example:

- Set target of **50%** of regional distribution of aeolian deposits (~130k ha)

- Establish clusters of deposits (using average nearest-neighbour distance, etc.)

- Capture 100% of all clusters comprising <5% of the regional distribution – these are the "***locally rare***" occurrences (~70k ha)

- Captured remainder of target as proportions of the large clusters – these are the "***locally common***" occurrences (~60k ha)

HCV Guidance Thresholds

- Two potential methods for identifying proportion to be captured as HCVF

2. Utilize a matrix to set targets based on local vs. regional patterns of distribution:

Example:

		Local	
		Rare	Common
Regional	Rare	100%	50%
	Common	50%	N/A

- Establish clusters of deposits (using average nearest-neighbour distance, etc.)

- Capture 100% of all clusters comprising <5% of the regional distribution – these are the "*locally rare*" occurrences (~70k ha)

- Captured 50% of the large clusters – these are the "*locally common*" occurrences (~96k ha)

- Total of **63%** of the regional distribution is captured
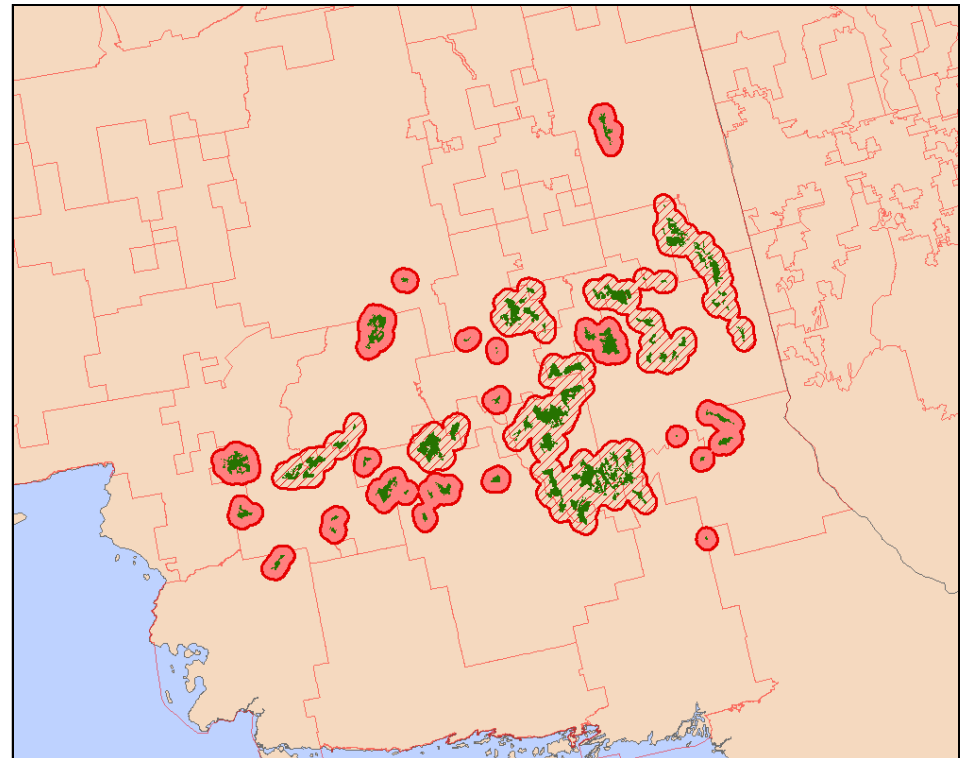
HCV4 Q14
Erosion Control
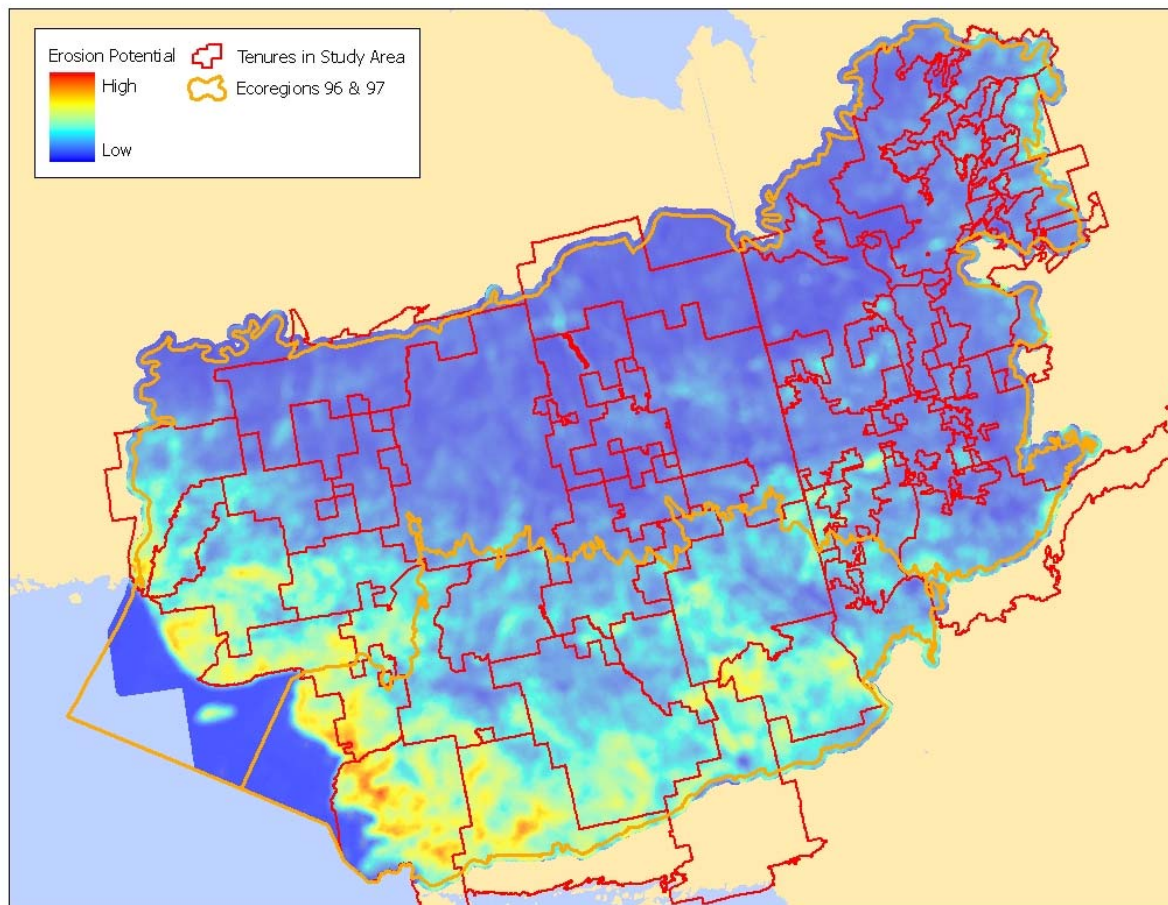
Analytical Approach

- Adapted provincial guidelines for erosion control to produce mappable units of high erosion potential

- Analysis based solely on slope data

- Soil types not factored into analysis as guidelines stated no appreciable difference in erosion potential (OMNR 1997) and fine scale soil data is not readily available

- ***Erosion Risk Guidance Thresholds***:
  - High Erosion Risk – Slopes > 30%
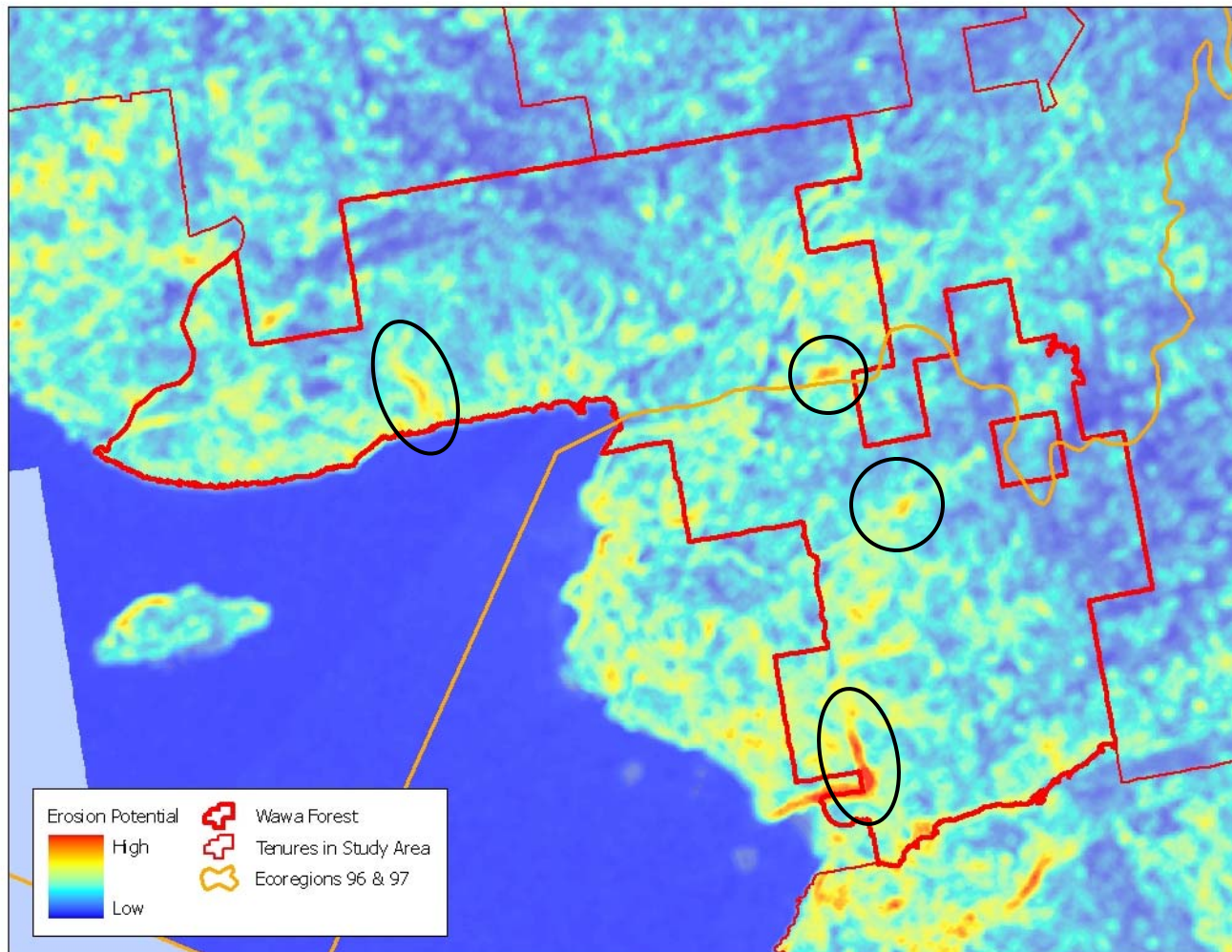 - Medium Erosion Risk – Slopes between 11% and 30%

Analytical Approach

- Direct mapping of slopes versus neighbourhood analysis
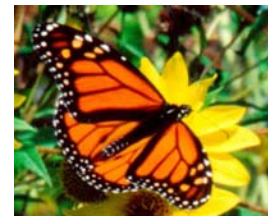
Analytical Approach

- Neighbourhood analysis of erosion potential in Wawa Forest
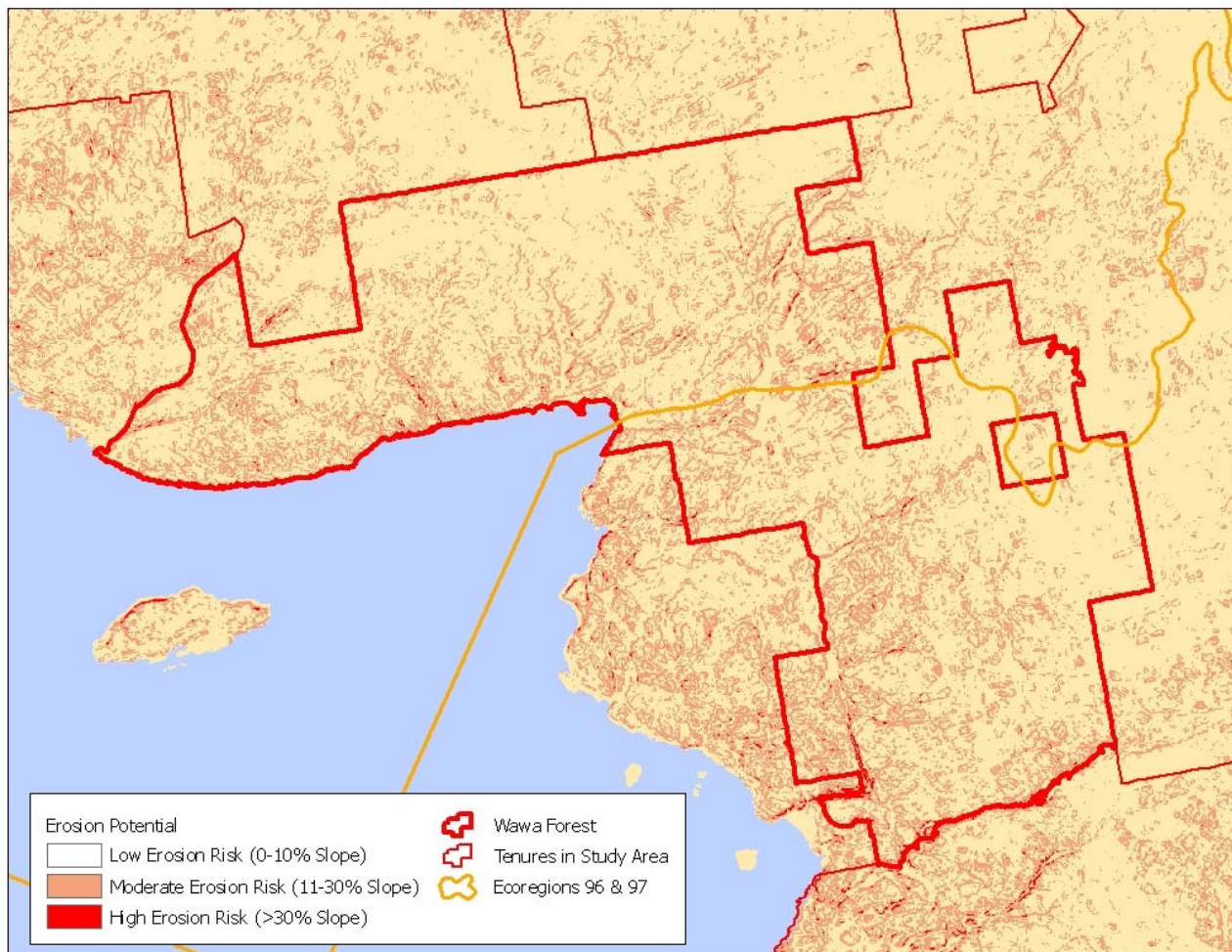
HCV Guidance Thresholds

- Two approaches to translating these "hotspots" into discrete, mappable units which can be assessed against thresholds:

1. Direct mapping of slope surface, and designating all above a threshold as HCV

2. Use an ecological or management based unit for analysis and assign thresholds for proportion of that unit at risk of erosion
   - *e.g.* watersheds or FRI stands

HCV Guidance Thresholds

- ***Direct mapping guidance thresholds***:
  - All high risk slopes are designated HCV

Erosion Potential
- Low Erosion Risk (0-10% Slope)
- Moderate Erosion Risk (11-30% Slope)
- High Erosion Risk (>30% Slope)

- Wawa Forest
- Tenures in Study Area
- Ecoregions 96 & 97

HCV Guidance Thresholds

- ***Proportion of FRI stand guidance thresholds*:**
  - > 50% at high risk, or >75% at high or medium risk is designated HCV
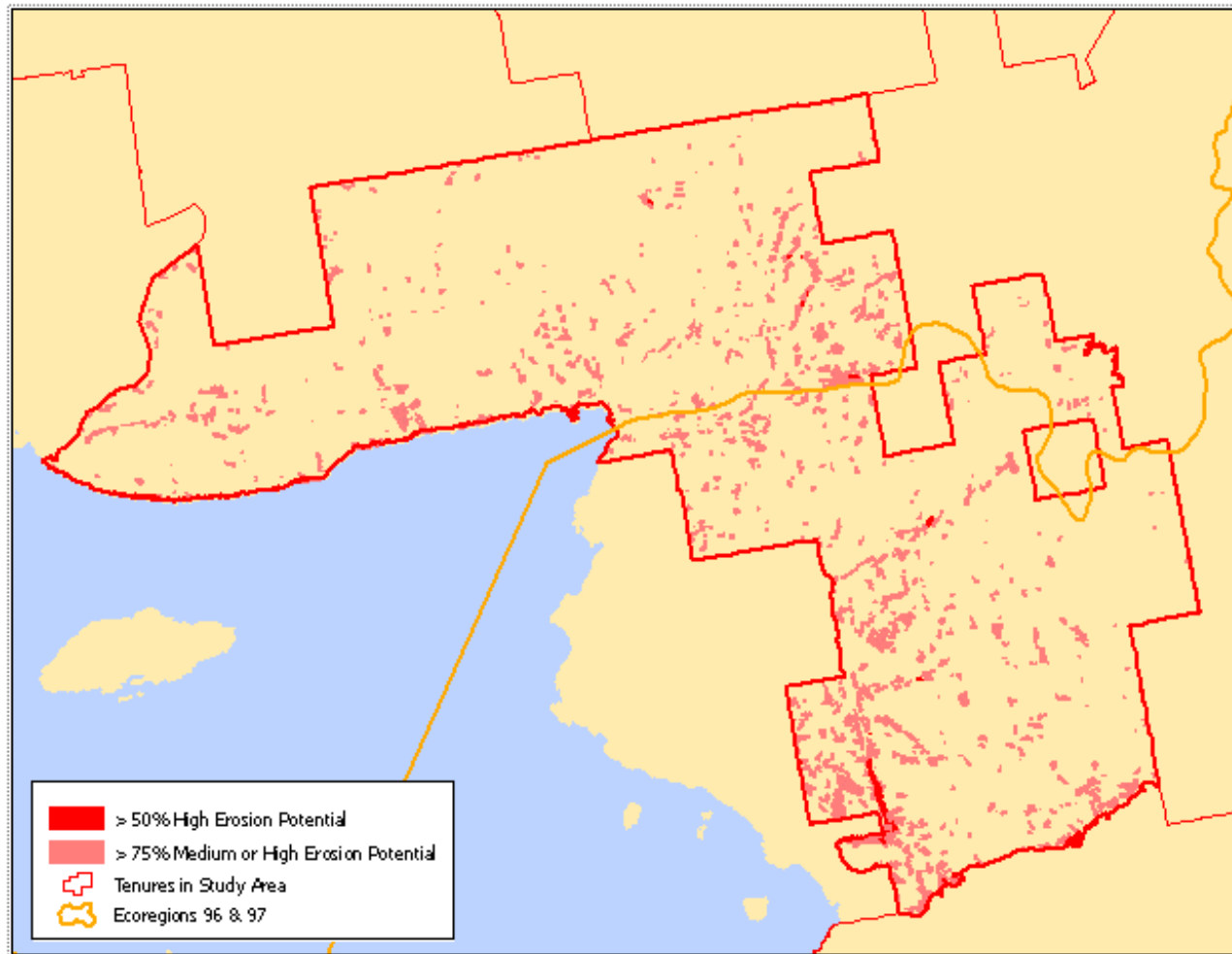
Summary

HCVF Support Document

- Intention is to provide additional guidance and ensure more consistent application of the HCVF Framework

- Document is a companion to the HCVF Framework – it does not replace or change guidelines

- Input can be made on approaches, methodologies and thresholds via drafts available for review