



WKH Project
Feasible Woodland Key Habitat identification on private forest land

Final Report

Institute for Environmental Solutions
2015

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Task of the Project

The Project “***Feasible Woodland Key Habitat identification on private forest land: WKH Project***” was implemented to develop system that allows estimation of approximate area of the potential woodland key habitats (WKH) on private forest land in Latvia, identification of feasible WKH from forest data description (State Register of Forests database) as well as to set up online web service allowing search of concrete private forest properties and ranking particular forest compartments into “Risky areas” – feasible WKH locations and “Green areas” – low possibility of WKH.

It was foreseen that combination of identification criteria as used in the “Inventory of woodland key habitats methodology” (Ek at al 2002), as well as additional features derivable from the State Register of Forests (SRF) and other Geographical Information Datasets could be used to elaborate filtering criteria ensuring achievement of the Project tasks.

Implementation of the Project was performed in the following phases:

- obtaining data from the State Register of Forests database;
- development of feasible WKH identification criteria (indicators) and filtering algorithm;
- filtering of the State Register of Forests database using developed set of indicators;
- *in-situ* assessment of the filtering results;
- adjustments of the indicators to improve filtering accuracy;
- setting up of the Online web service tool - Forest Habitat Instrument (Meža biotopu instruments).

Project implementation time 01/05/2015 – 15/08/2015

Project implementation

Description of input data

State Register of Forests database from the State Forest Service were requested on the basis of a Cooperation Agreement with Institute for Environmental Solutions determining data availability for scientific and research purposes.

Requested State Register of Forests database (maintained by State Forest Service) was obtained on 22/05/2015. Database covered private forest area of 1'487'608.02 ha and stored description of 1'707'358 unique forest units (forest compartments). Legislation foresees that every forest owner is obliged to submit regularly updated information on conditions of the forest stands in his/her property and State Forest Service is responsible for verification of submitted data before incorporation into State Register of Forests database. Implemented system gives certain confidence for data reliability and possible use of State Register of Forests data for various forest resource and site specific assessment exercises.

Description of data obtained from SFS State Register of Forests:

- Total number of units (forest compartments) = **1'707'358**
- Total area = 1'487'608.02 ha
- Total number of unique cadastral units = 224'291
- Average unit (forest compartment) size = 0.87 ha
- Number of units (forest compartments) with some forest management limitations = 442'394
- Unique types (conditions) of forest management limitations = 460

Additionally GIS data sets of Natura 2000 sites and 25 x 25 m digital terrain model covering whole territory of Latvia was used as complementary data layers providing supplementary characteristics of forest sites.

Selection of parameters for data filtering

As the basic set of criteria for identification of forest compartments corresponding to parameters of feasible WKH criteria listed in the *"Inventory of woodland key habitats methodology"* (Ek at al 2002) were used.

Three sets of criteria (see the table below) consisting of the age and particular tree species representation (%) in the forest stand were selected for initial filtering algorithm – *WKH methodology criteria*. One set (v1) was selection for application in forest stand on dry mineral soils, second set (v2) for forest stands on wet mineral and peat soils and the third set (v3) for forests stands with presence of solitary old trees.

Species	Age v1	Proportion v1	Age v2	Proportion v2	Age v3	Proportion v3
Pine	121	30%	101-120	30%	151	30%
Spruce	111	50%	95-110	50%	151	50%
Birch	91	50%	81-90	50%	100	50%
Black alder	71	30%	55-70	30%	100	30%
Aspen	61	20%	N/A	N/A	110	20%

Grey alder	51	50%	N/A	N/A	70	50%
Oak	101	10%	81-100	10%	151	10%
Ash	61	20%	N/A	N/A	100	20%
Linden	61	5%	41-60	20%	N/A	N/A
Elm	71	5%	61-70	20%	N/A	N/A
Willow	51	10%	N/A	N/A	70	10%
Maple	61	5%	51-60	20%	N/A	N/A

Alternative set of criteria (tree species composition and age, growth conditions) was extracted from forest stand descriptors in previously identified and mapped WKH in State owned forests and within specially protected nature territories – *criteria of recognized WKH*.

Additionally digital terrain data were used to identify forest stands on slopes and ravines complementing tree species composition and age data to improve identification of the forest stands bearing complex conditions for forest management thus supporting feasibility of conditions and structures suitable for WKH indicator species.

Initial results from filtering

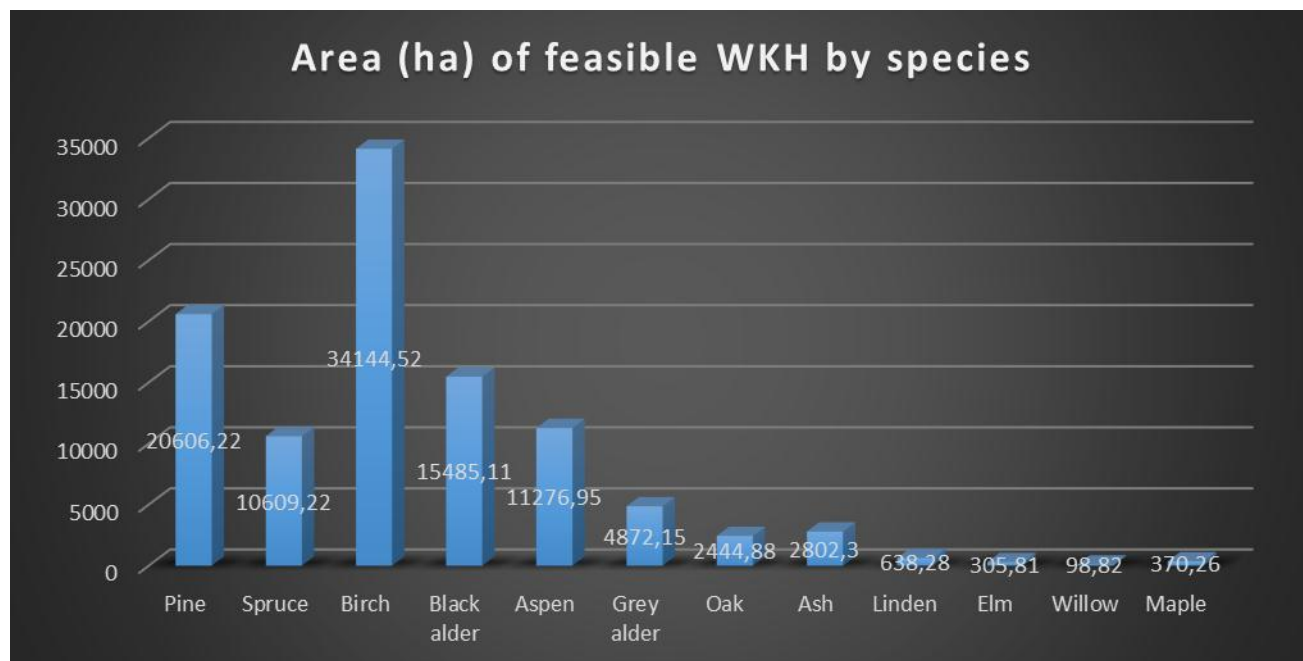
Before filtering pre-processing of State Register of Forests database was carried out. Forest compartments with forestry restrictions excluding timber production from those stands were removed from further filtering.

As the next step *WKH methodology criteria* and *criteria of recognized WKH* were applied separately and results of both filtering results were compared. Results from both sets of criteria demonstrated close results confirming the suitability of both approaches.

Filtering of the State Register of Forests database using developed set of indicators resulted in identification of 103'654 ha of feasible WKH that compile approximately **8%** of total private forest area (see table below).

Species	Area in SFS Database (ha)	Area filtered (ha)	Area filtered %
Pine	269590,84	20606,22	8
Spruce	194654,14	10609,22	5
Birch	519263,07	34144,52	7
Black alder	41311,71	15485,11	37
Aspen	102353,60	11276,95	11
Grey alder	188144,09	4872,15	3
Oak	5899,73	2444,88	41
Ash	6137,72	2802,30	46
Linden	1145,87	638,28	56
Elm	872,69	305,81	35
Willow	1990,27	98,82	5
Maple	899,25	370,26	41
Total	1332262,98	103654,52	8

Largest area of feasible WKH are represented by birch stands however it covers only approximately 7% of forest stands that are dominated by birch. Largest in terms of the proportions of the particular species forest stands identified as feasible WKH are forest stands dominated by broadleaves - linden (56%), ash (46%), oak (41%), maple (41%) and elm (35%). Significant proportion of black alder dominated stands (37%) were identified as feasible WKH due to age structure of the particular species that can be explained by growth conditions defining difficult accesses for timber harvesting.



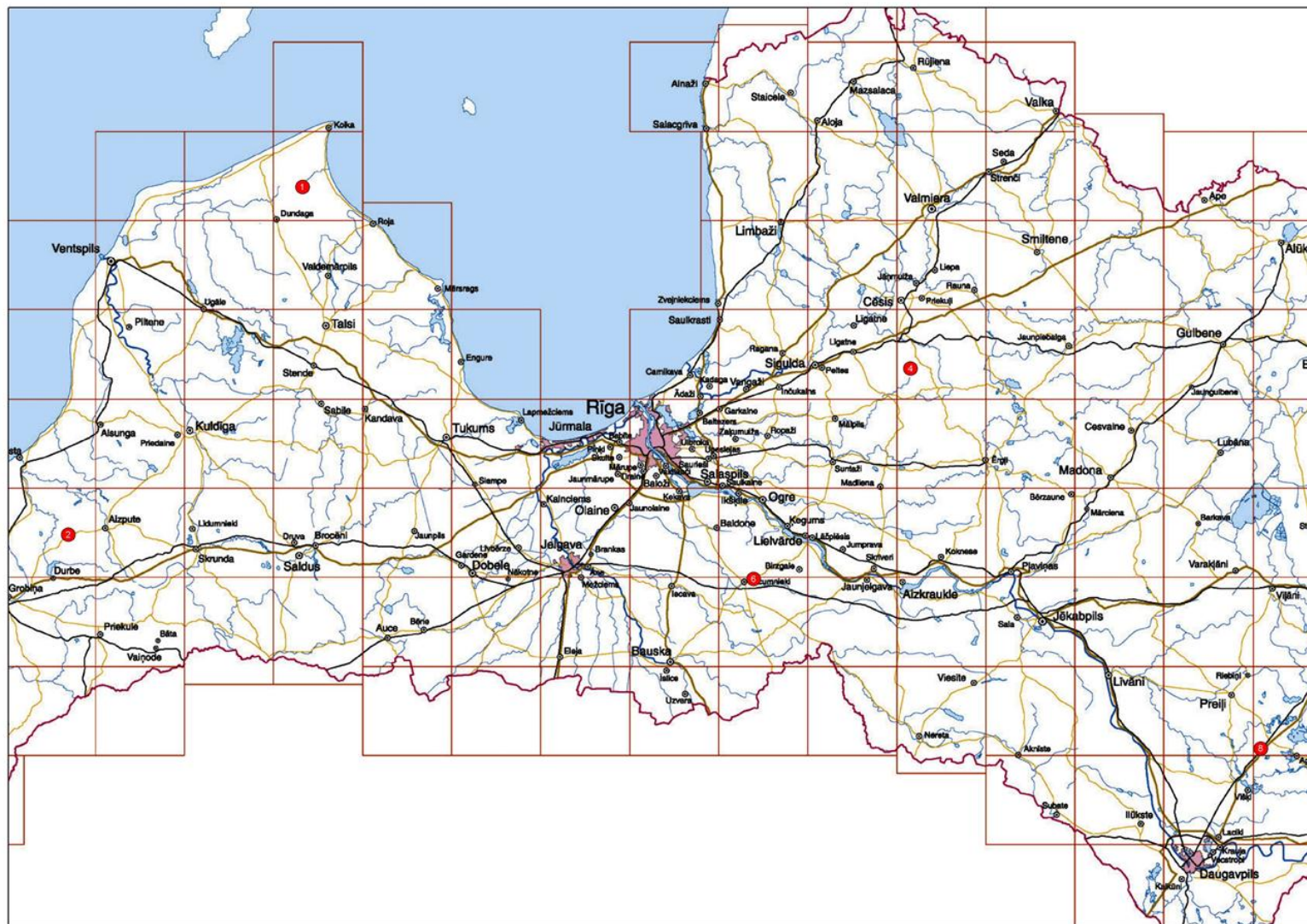
Selection of field control sites and results from the field controls

Testing of accuracy of the filtering algorithm was carried out during field surveys. Five locations each covering 160 - 200 ha were selected to cover variation of forest habitats, geographical and social conditions of different parts of Latvia (see map below).

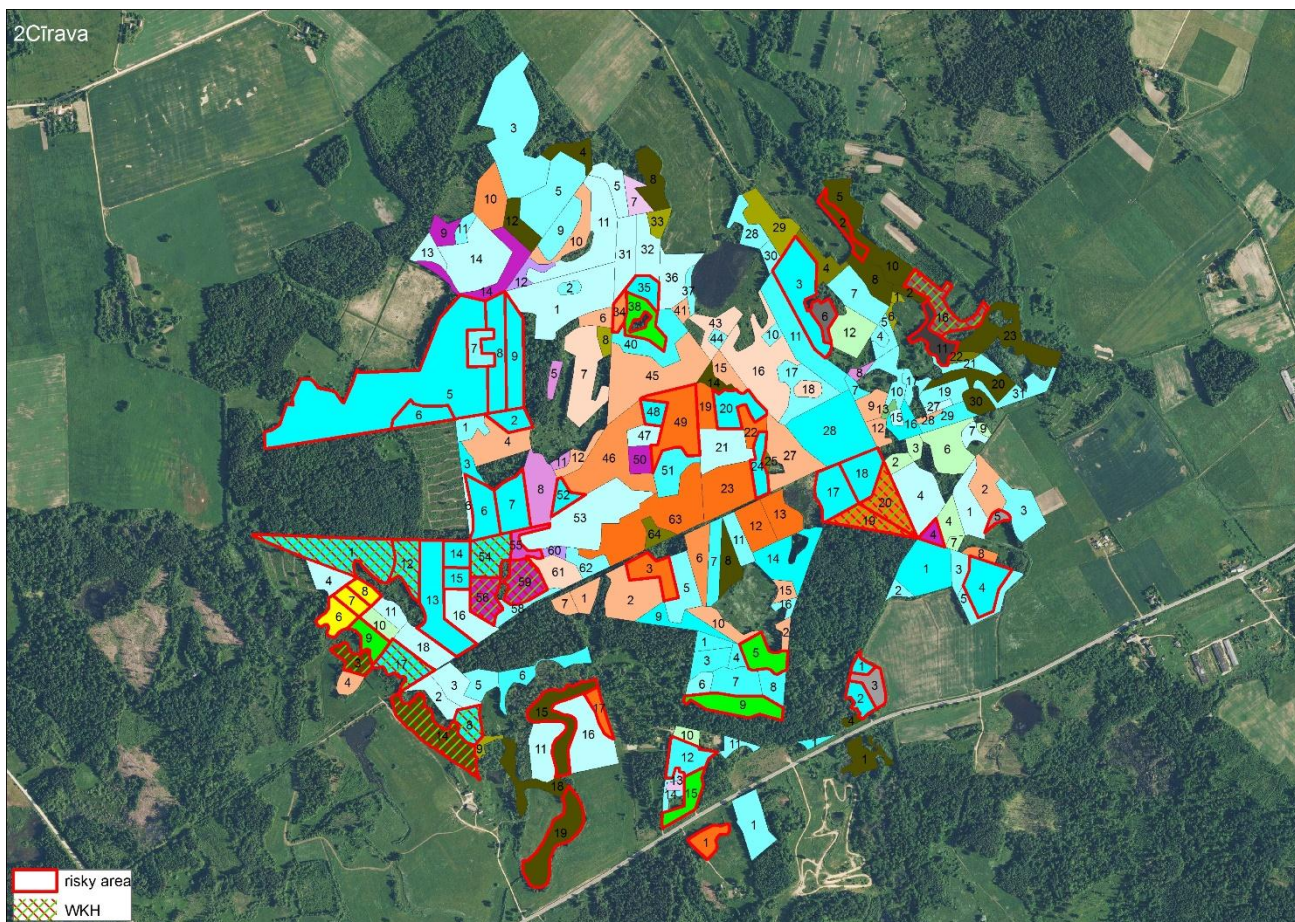
The forest stand level evaluation was carried out by experienced forest inventory specialists and forest habitat experts (certified according to requirements set by national legislation). All forest compartments ("Risky areas" as well as "Green areas") within test sites were visited and evaluated. WKH status of each forest stand was decided according to the *"Inventory of woodland key habitats methodology"* (Ek et al 2002).

In average **14%** of areas identified as feasible WKH ("Risky areas") were evaluated as sites that corresponds to quality of WKH and approximately **2%** of non-"Risky areas" were also evaluated as WKH. Main reason for defining WKH within the non-"Risky areas" ("Green areas") was inaccuracy of forest description data and specific local conditions that are not indefinable otherwise than in the field.

Extending field test results to whole area of private forest land it is estimated that approximately **3.5 - 4%** of forest area can be identified as WKH if field WKH inventory were carried out in full scale.

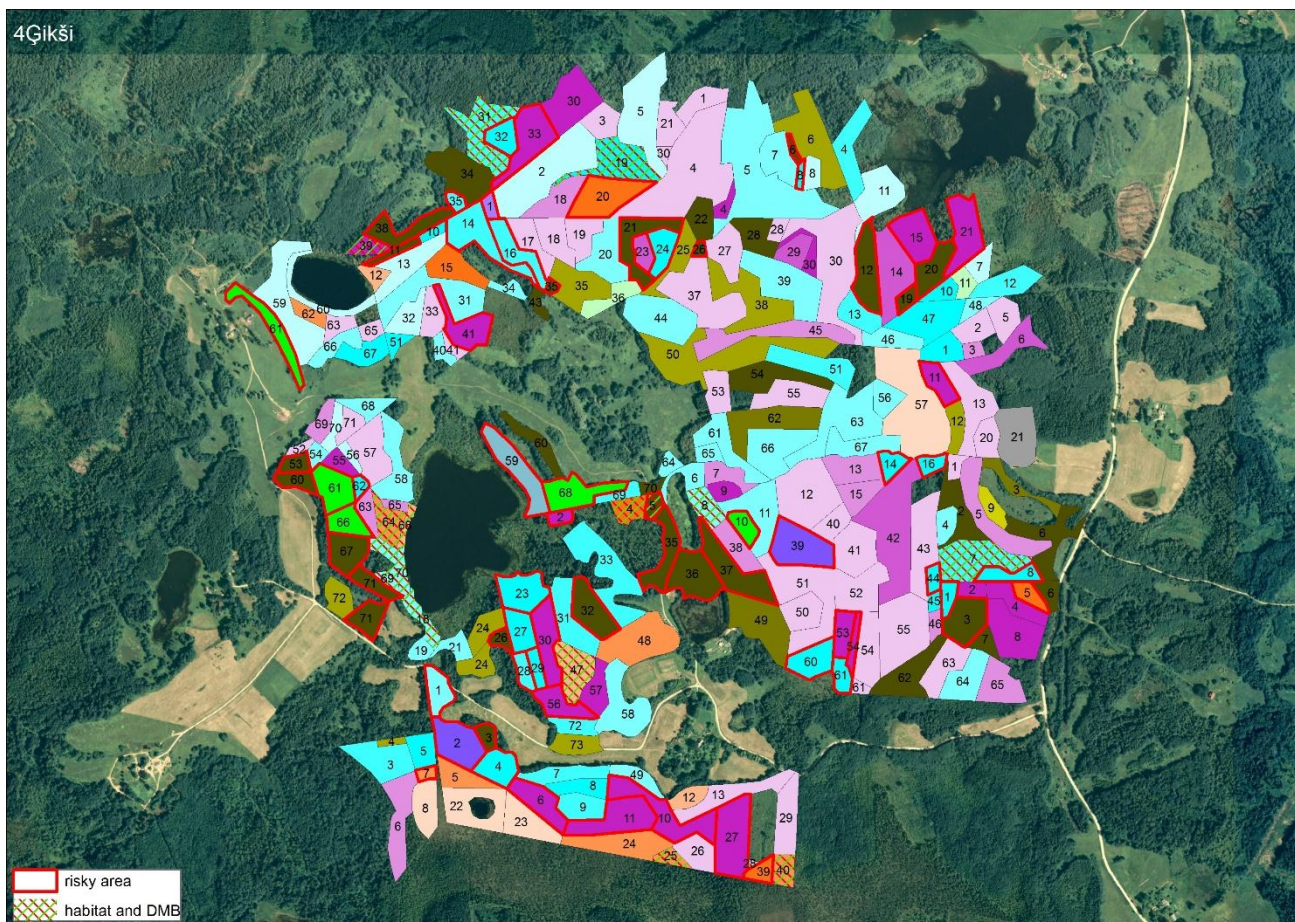


Locations of field control sites



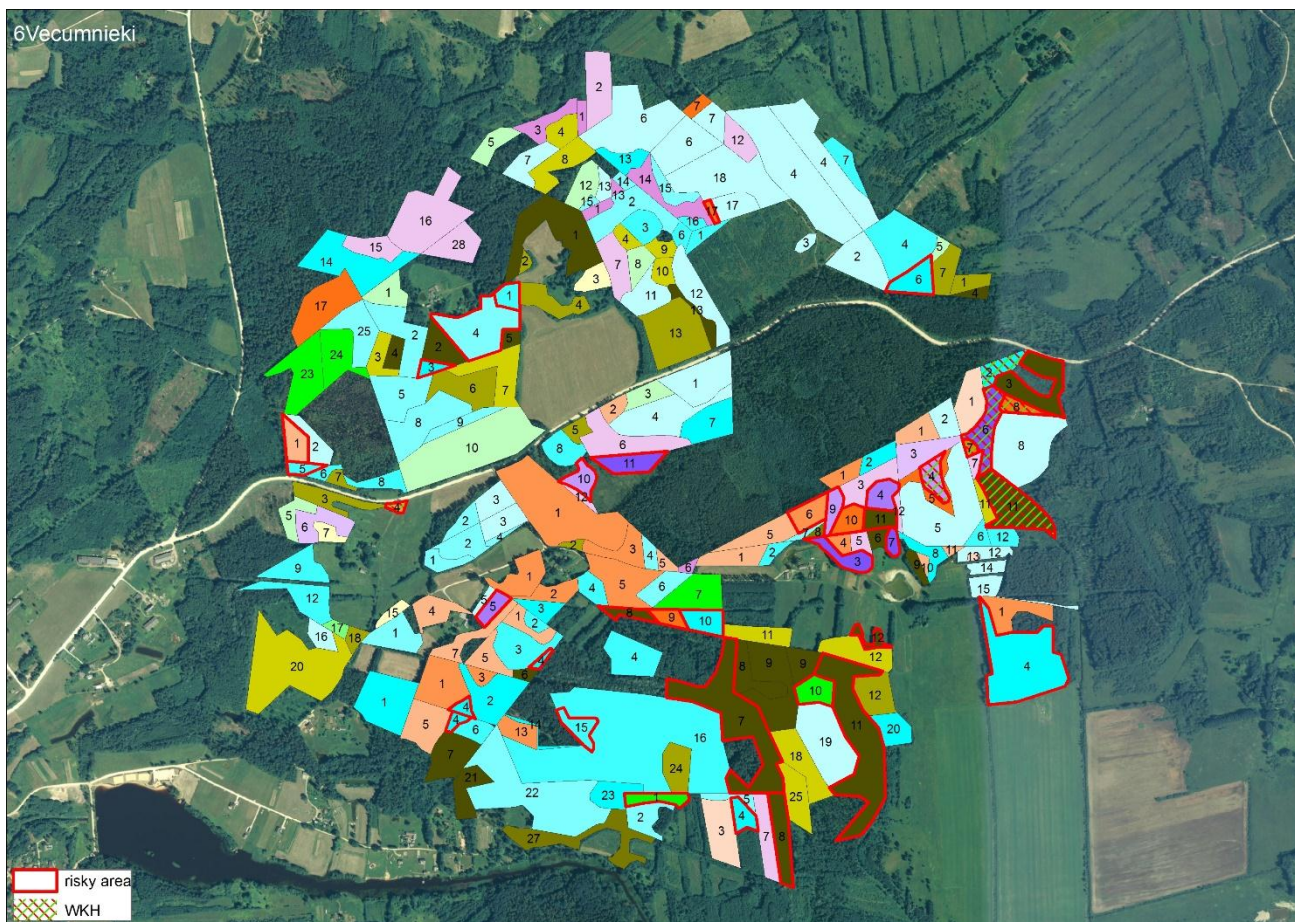
Cirava #2		Total visited areas		215	211,90		
Risky areas		56	65,10	Green areas		159	146,80
12	%		%	0	%		%
14,70	21,4		78,6	0,00	0,0		100,0
WKH	22,6		77,4	WKH	0,0		100,0
			50,40				146,80
			No WKH				No WKH

Within field test site #2 in total 215 forest compartments with total area of 212 ha were visited – 56 “Risky areas” and 159 “Green areas”. Only 6% of forest stands pre-selected as “Risky areas” were identified as WKH during on site evaluation. None of the “Green areas” were identified as WKH.



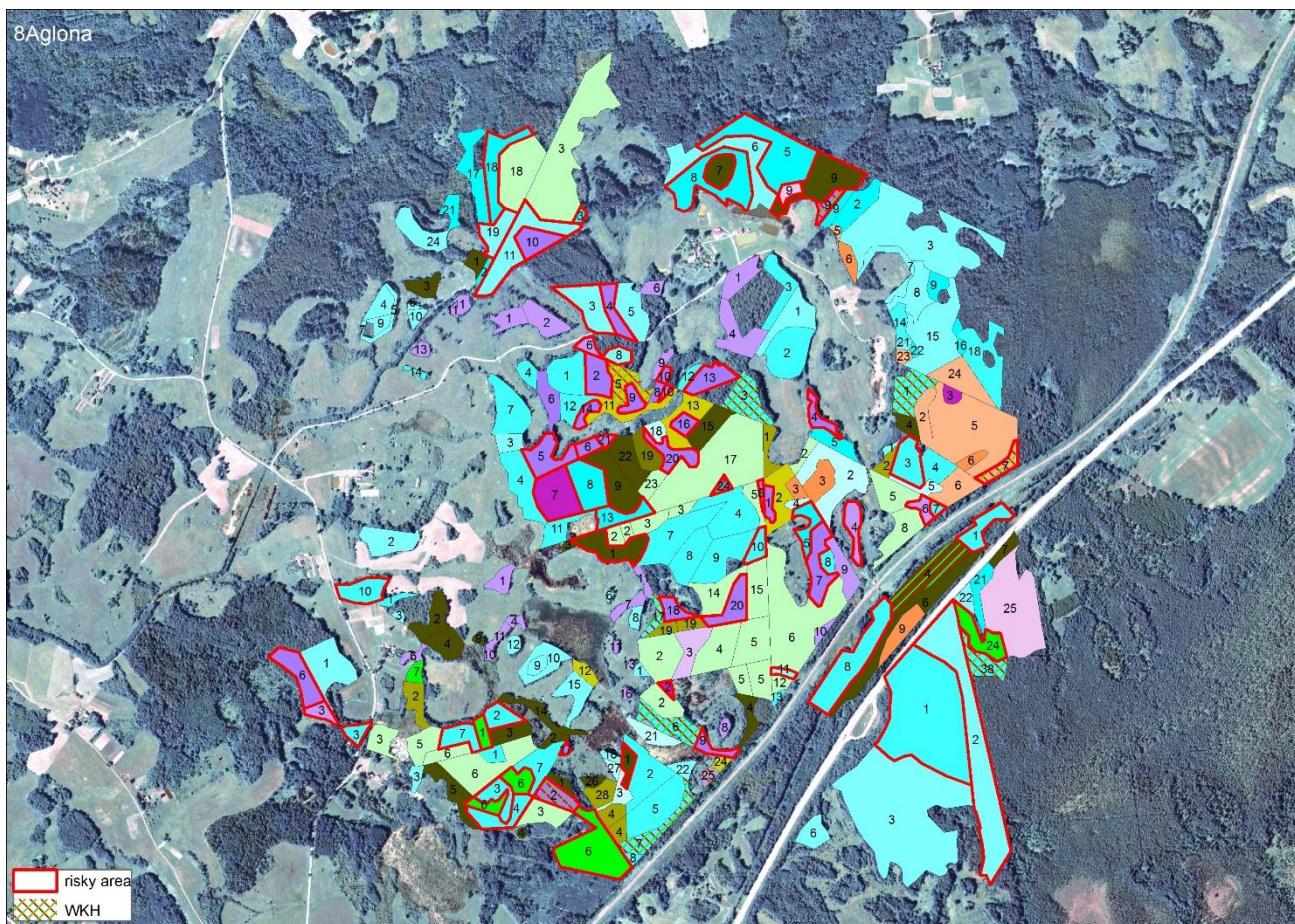
Çikši #4									
Total visited areas				251	210,50				
Risky areas				68	42,80	Green areas			
				1	%				
				0,20	1,5				
WKH					0,5				
					98,5				
					99,5				
					42,60				
					No WKH				
				14	%				
				10,20	7,7				
					6,1				
					92,3				
					93,9				
					157,50				
					No WKH				

Within field test site #4 in total 251 forest compartments with total area of 210 ha were visited – 68 “Risky areas” and 183 “Green areas”. Only one forest stands pre-selected as “Risky areas” were identified as WKH during on site evaluation. Almost 8% (6% by area) of the “Green areas” were identified as WKH. Main reason for out-standing results from particular test site is local conditions – complex access defined by the terrain as well as uncharacteristic lack of forest management activities within some parts of the test site.



Vecumnieki #6									
Total visited areas				217	223,60				
Risky areas				39	33,40				
Green areas				178	190,20				
		%			%		%		
6	15,4			33	0,6		99,4		
3,90	11,7			29,50	0,3		99,7		
WKH			No WKH	WKH			No WKH		

Within field test site #6 in total 217 forest compartments with total area of 224 ha were visited – 39 “Risky areas” and 178 “Green areas”. In average 15% forest stands pre-selected as “Risky areas” were identified as WKH during on site evaluation. Only one forest stand of the “Green areas” were identified as WKH.



Aglona #8									
Total visited areas				236	178,60				
Risky areas				65	55,27				
Green areas				171	123,33				
		%		%			%		%
4	6,2		93,8	61	9	5,3	94,7	162	
1,50	2,7		97,3	53,77	7,40	6,0	94,0	115,93	
WKH			No WKH		WKH		No WKH		

Within field test site #8 in total 236 forest compartments with total area of 179 ha were visited – 65 “Risky areas” and 171 “Green areas”. Approximately 6% of the forest stands pre-selected as “Risky areas” were identified as WKH during on site evaluation. 5% of the “Green areas” were identified as WKH. Main reason for slightly increased representation of WKH within areas pre-selected as “Green areas” is presence of beaver damaged forest stands.

Online web service tool – Forest Habitat Instrument (Meža biotopu instruments)

As final step of the Project Online web service tool – Forest Habitat Instrument (Meža biotopu instruments) was elaborated and launched allowing search of “Risky areas” and “Green areas”. Search of “Risky areas” and “Green areas” is based on input of the cadastral number land unit + forest block + forest compartment identifier.



Meža biotopu instruments

Meklēt datu bāzē

Iziet

Meklēt datu bāzē

Zemes vienības kadastra numurs *

Kvartāla numurs *

Nogabala numurs *

Meklēt

2015 Meža biotopu instruments

Search input interface of the Online web service tool



Meža biotopu instruments

Meklēt datu bāzē

Iziet



Zemes vienības kadastra numurs: 60560050055

Kvartāla numurs: 1

Nogabala numurs: 1

Iespējams aizsargājams meža biotops vai noteikti vides aizsardzības ierobežojumi.

Meklēt datu bāzē

Zemes vienības kadastra numurs *

Kvartāla numurs *

Nogabala numurs *

Meklēt

“Risky area” result interface the Online web service tool



Meža biotopu instruments

Meklēt datu bāzē

Iziet



Zemes vienības kadastra numurs: 60560050055

Kvartāla numurs: 1

Nogabala numurs: 9

Aizsargājamas dabas vērtības nav vai maz iespējamas.

Meklēt datu bāzē

Zemes vienības kadastra numurs *

Kvartāla numurs *

Nogabala numurs *

Meklēt

“Green area” result interface the Online web service tool