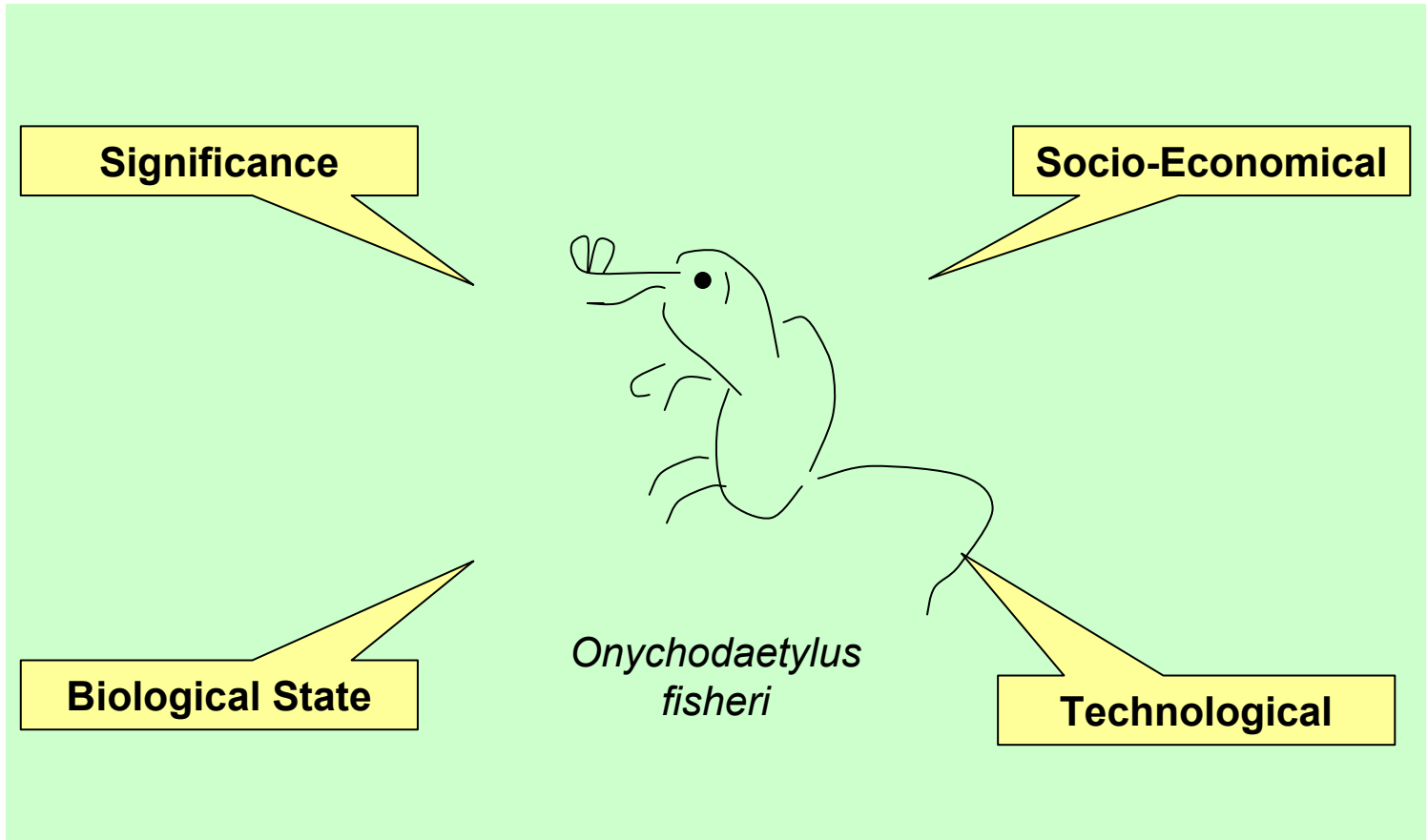


Each specie is described by criteria sets



Index is based on criteria sets

1

Any index I is a variable that contains all the necessary information on the species.

2

The specie's state is described by the set of criteria:

$$S = (k_1, k_2, \dots, k_n).$$

3

The specie's index depends on specie's state:

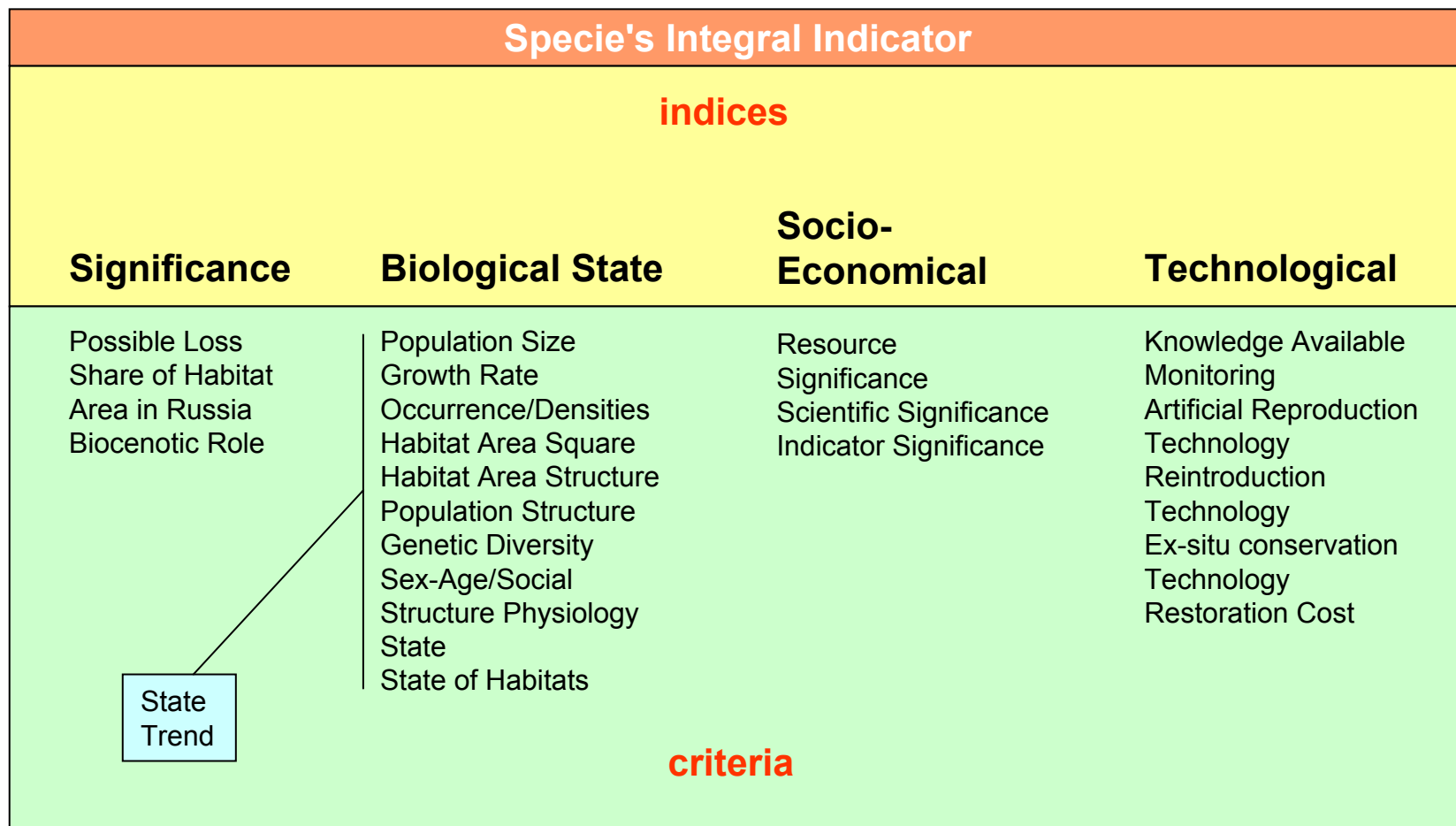
$$I = f(S).$$

4

Here f is an algorithm that calculates the index I from its description X , the algorithm is based on:

- Pareto slicing (classification) method,
- expert estimations concordance method.

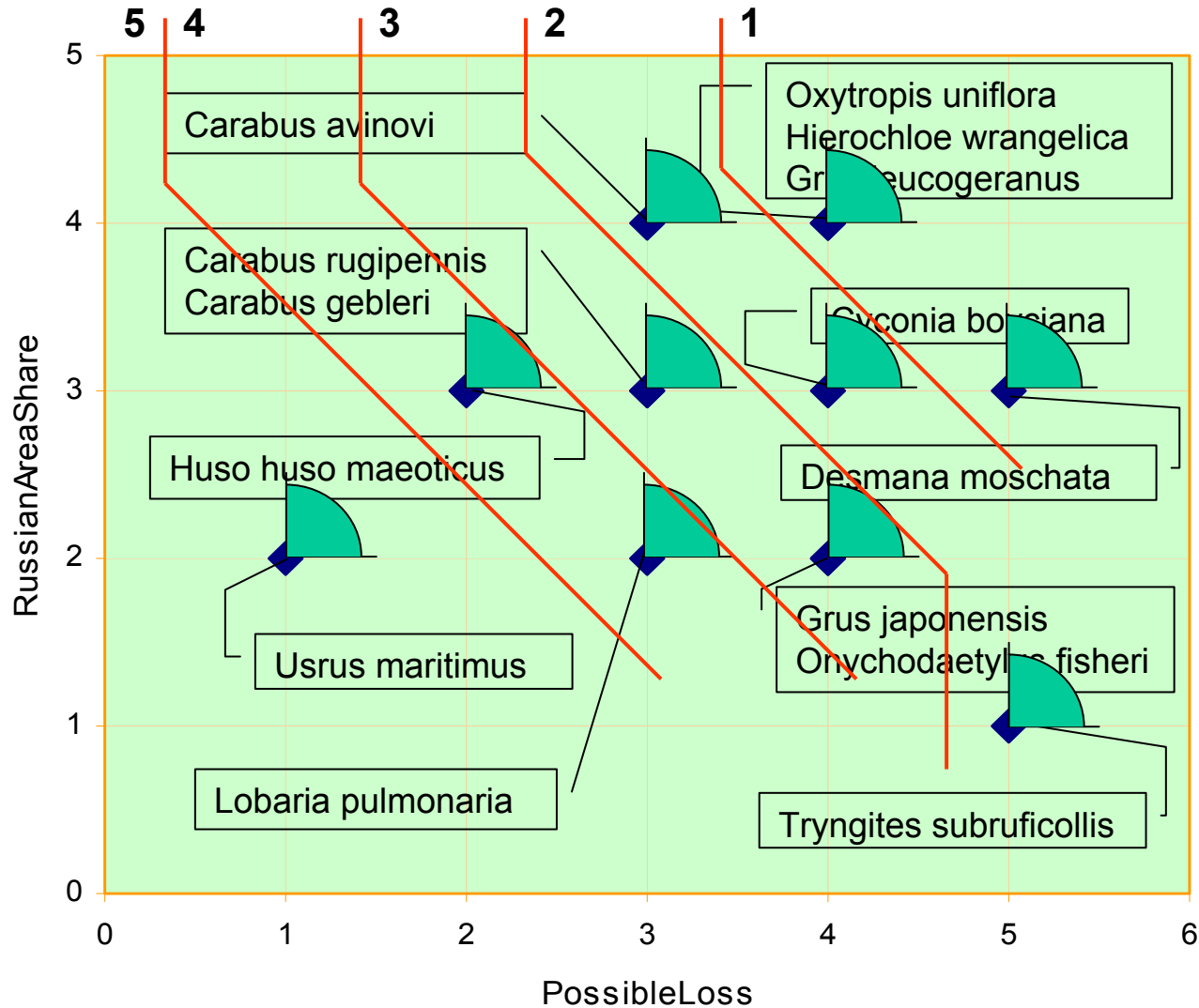
Three-level hierarchy of the indices



Categorical data (partial criteria) provided by the experts on the species features

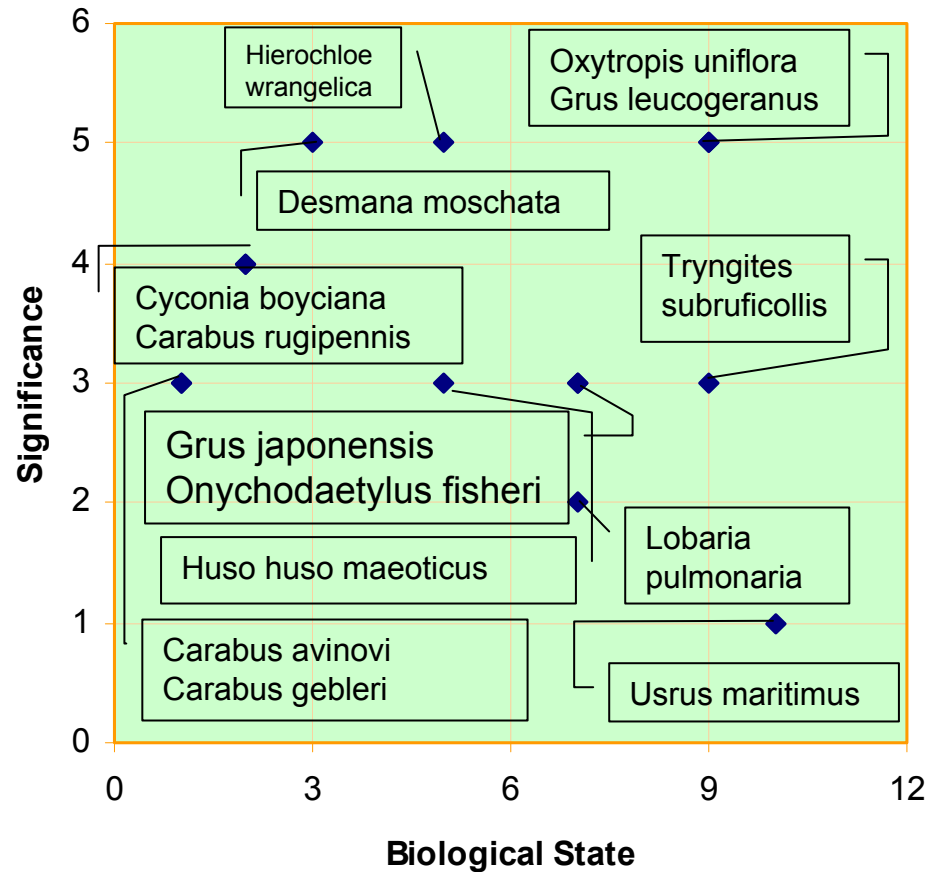
Species	<i>Carabus rugipennis</i>	<i>Carabus avinovi</i>	<i>Carabus gebleri</i>	<i>Lobaria pulmonaria</i>	<i>Oxytropis uniflora</i>	<i>Hierochloe wrangelica</i>	<i>Huso huso maoticus</i>	<i>Onychodaetyl us fisheri</i>	<i>Cyconia boyciana</i>	<i>Grus leucogeranus</i>	<i>Grus japonensis</i>	<i>Tryngites subruficollis</i>	<i>Desmana moschata</i>	<i>Urus maritimus</i>
Significance for Biodiversity Conservation														
✓ PossibleLoss	3	3	3	3	4	4	2	4	4	4	4	5	5	1
RussianAreaShare	3	4	3	2	4	4	3	2	3	4	2	1	3	2
BiocenoticRole	1	1	1	1	1	2	1	1	1	1	1	1	1	1
Biological State														
PopulationSize	2	2	1	3	2	1	1	2	1	1	1	2	1	3
PopulationSizeTrend	2	2	2	2	3	3	2	3	1	3	3	4	2	4
GrowthRate	1	1	1	1	2	2	2	1	1	1	1	2	1	2
GrowthRateTrend	1	1	1	2	2	2	1	2	1	2	2	2	1	3
Occurence/Densites	2	2	1	2	3	3	1	1	2	2	2	2	2	3
Occurence/DensitesT	2	2	2	2	3	2	1	3	2	3	3	3	2	4
HabAreaSquare	2	2	1	3	1	1	1	2	1	1	1	1	2	3
HabAreaSquareTrend	2	2	2	2	3	2	1	2	2	3	3	3	2	3
HabAreaStructure	5	5	1	3	1	1	5	2	2	4	3	2	2	5
HabAreaStructureTrend	3	3	2	1	2	2	2	2	1	3	2	2	1	3
PopulationStructure	1	1	1	2	1	1	2	2	1	2	2	2	1	1
PopulationStructureT	2	2	2	1	2	2	1	2	2	2	2	2	2	2
PhysiolState	3	3	3	3	3	3	3	3	3	3	2	3	3	3
PhysiolStateTrend	2	2	2	2	2	2	1	2	2	2	2	2	2	2
HabitatState	2	2	1	2	3	3	1	3	3	2	2	3	3	3

Index calculation using Pareto slicing technique



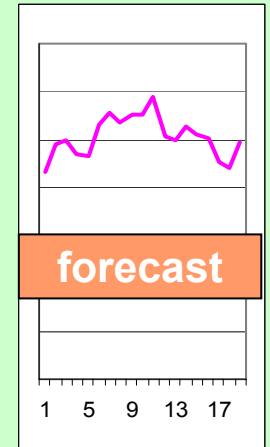
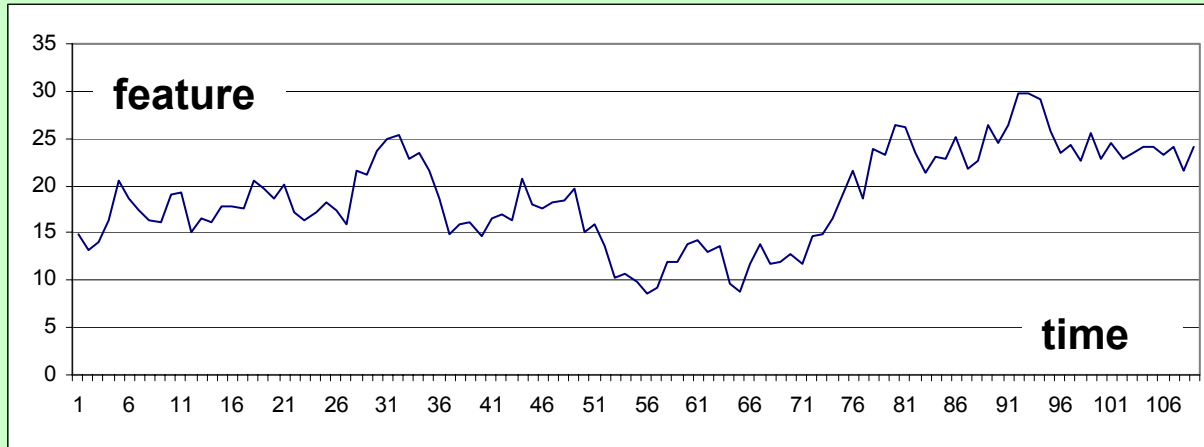
Two result indices: Significance and Biological State

Species	Significance	Biological State
Carabus rugipennis	4	2
Carabus avinovi	3	1
Carabus gebleri	3	1
Lobaria pulmonaria	2	7
Oxytropis uniflora	5	9
Hierochloe wrangelica	5	5
Huso huso maeoticus	3	5
Onychodaetylus fisheri	3	7
Cyconia boyciana	4	2
Grus leucogeranus	5	9
Grus japonensis	3	7
Tryngites subruficollis	3	9
Desmana moschata	5	3
Urus maritimus	1	10

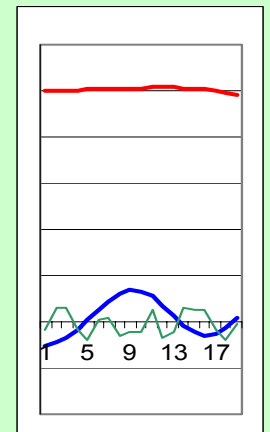
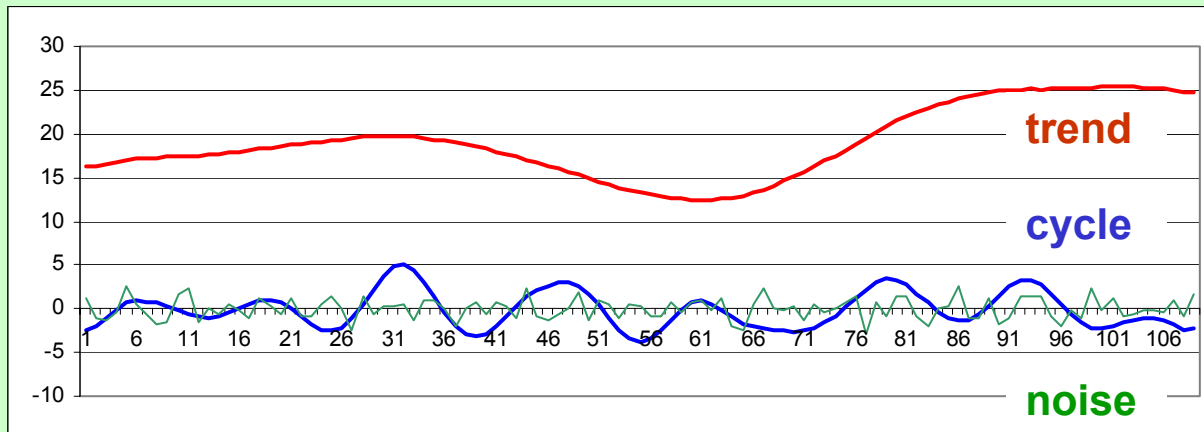


Forecasting of a species features using time-series analysis

Life cycle of a species is described as time series of its features



The feature contains three components, that are: trend, cyclic, and noise



Decomposing the species life history to forecast the features development