

Macrophytes as an indicator for environmental changes

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Introduction



**Submerged
Macrophytes**

e.g.

*Potamogeton
perfoliatus*



**Floating
Macrophytes**

e.g.

*Nuphar-
nymphaeatum*

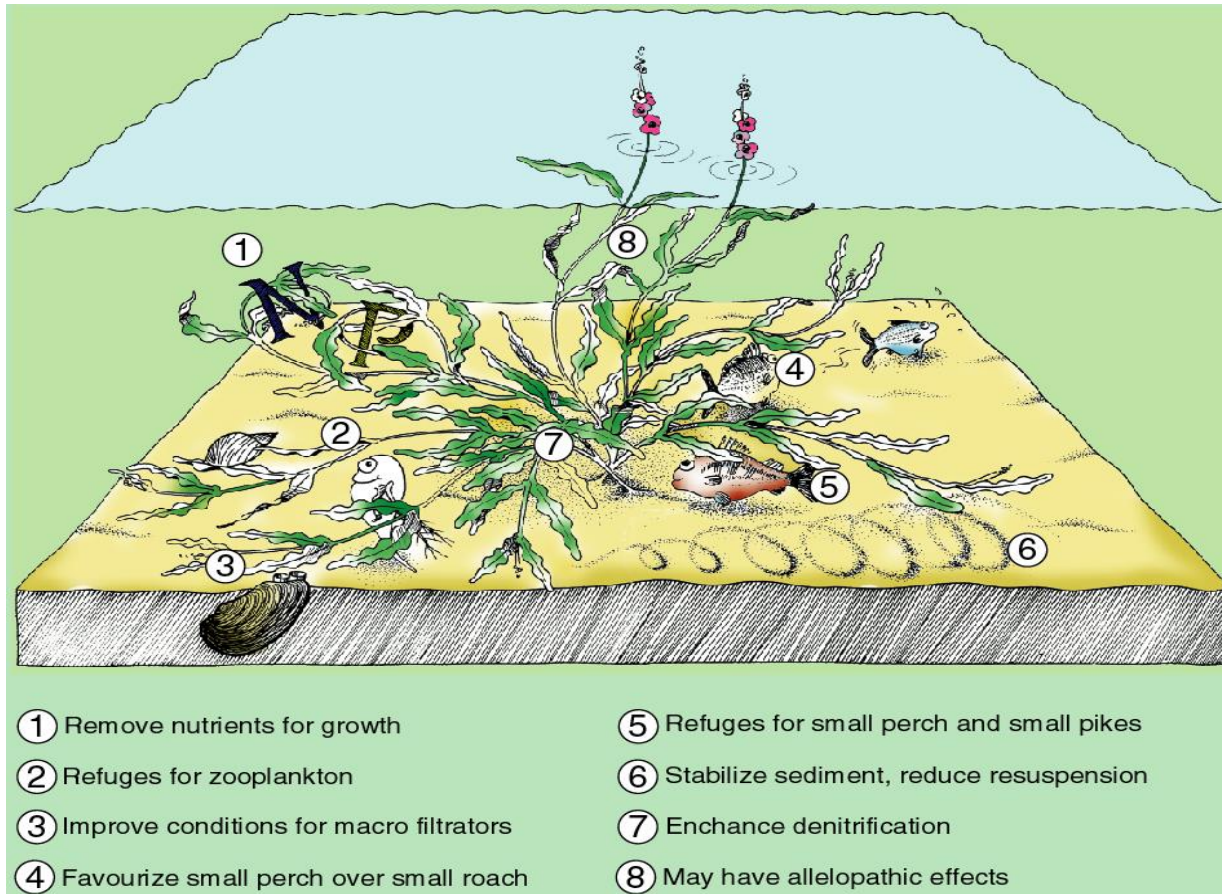


**Emergent
Macrophytes**

e.g.

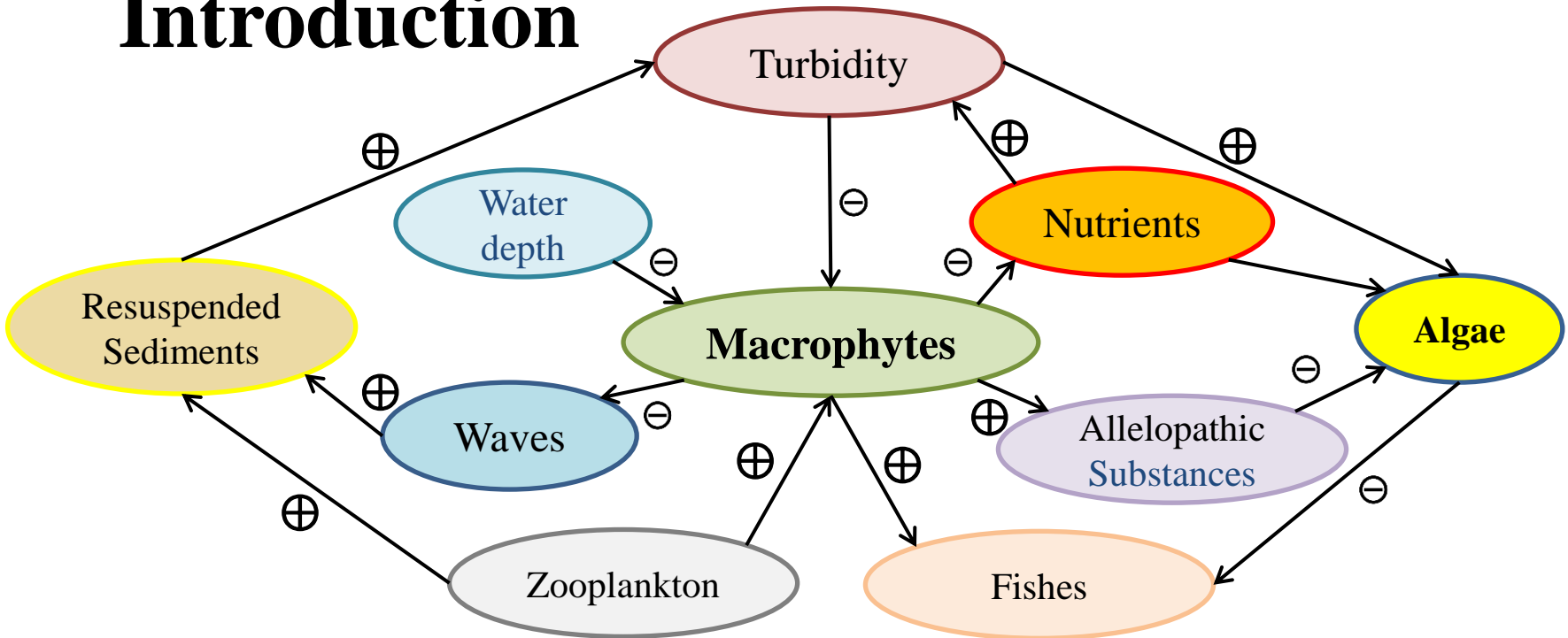
*Phragmites
communis*

Introduction



**Sketch of roles of submerged macrophytes in aquatic ecosystem
(Cited from Jeppesen et al., 2004)**

Introduction



- **What is the current situation of macrophytes in the lake?**
- **How the environmental condition changes along this years?**

Method



**Field work——
Determining the
range of
macrophytes
communities in
Lake Durowskie**

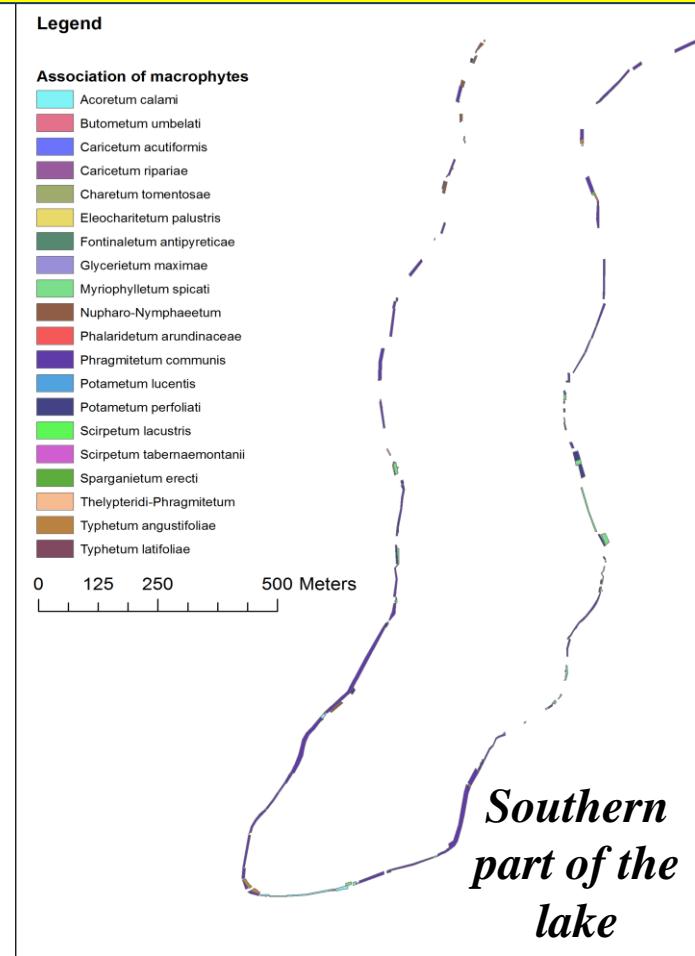
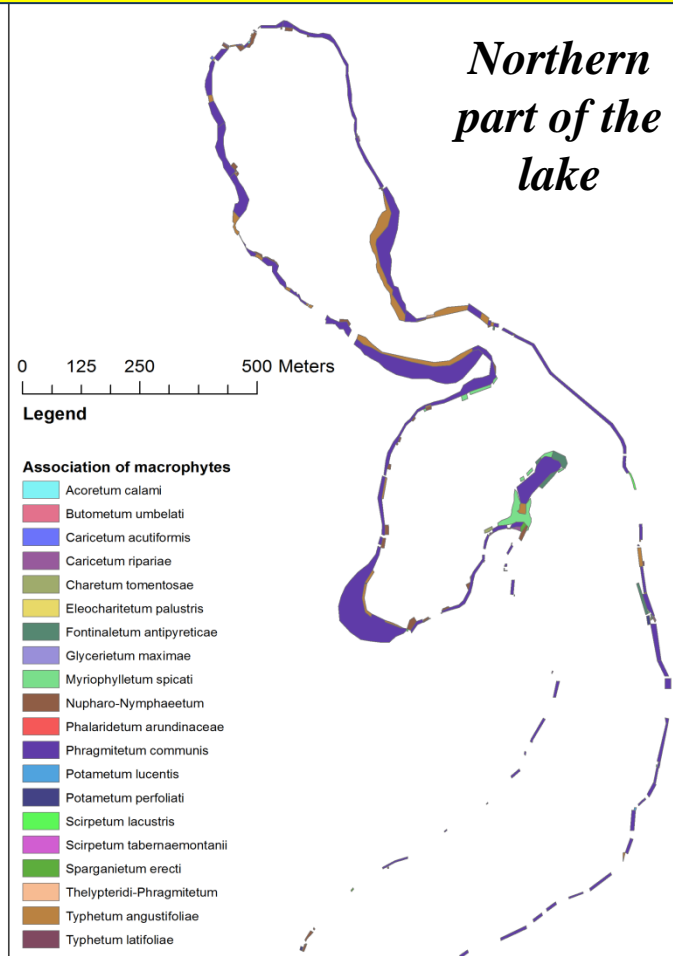
**Data analysis——
Mapping the communities
in the program ArcGIS
and statistics analysis**

(Photos by Qu, 2015)



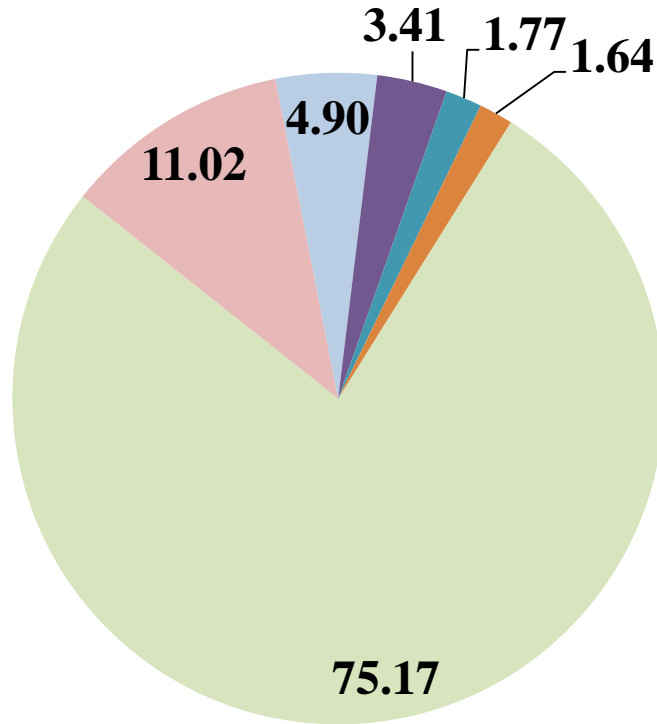
Result

Maps of the distribution of macrophytes communities in the lake Durowskie



Result

The dominant macrophytes communities in Lake Durowskie



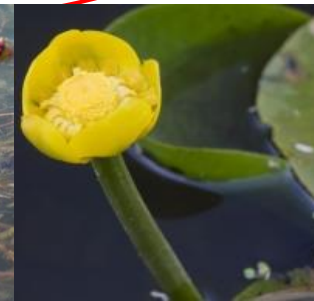
Phragmitetum communis

Typhetum angustifoliae

Myriophylletum spicati

Nupharo-Nymphaeetum

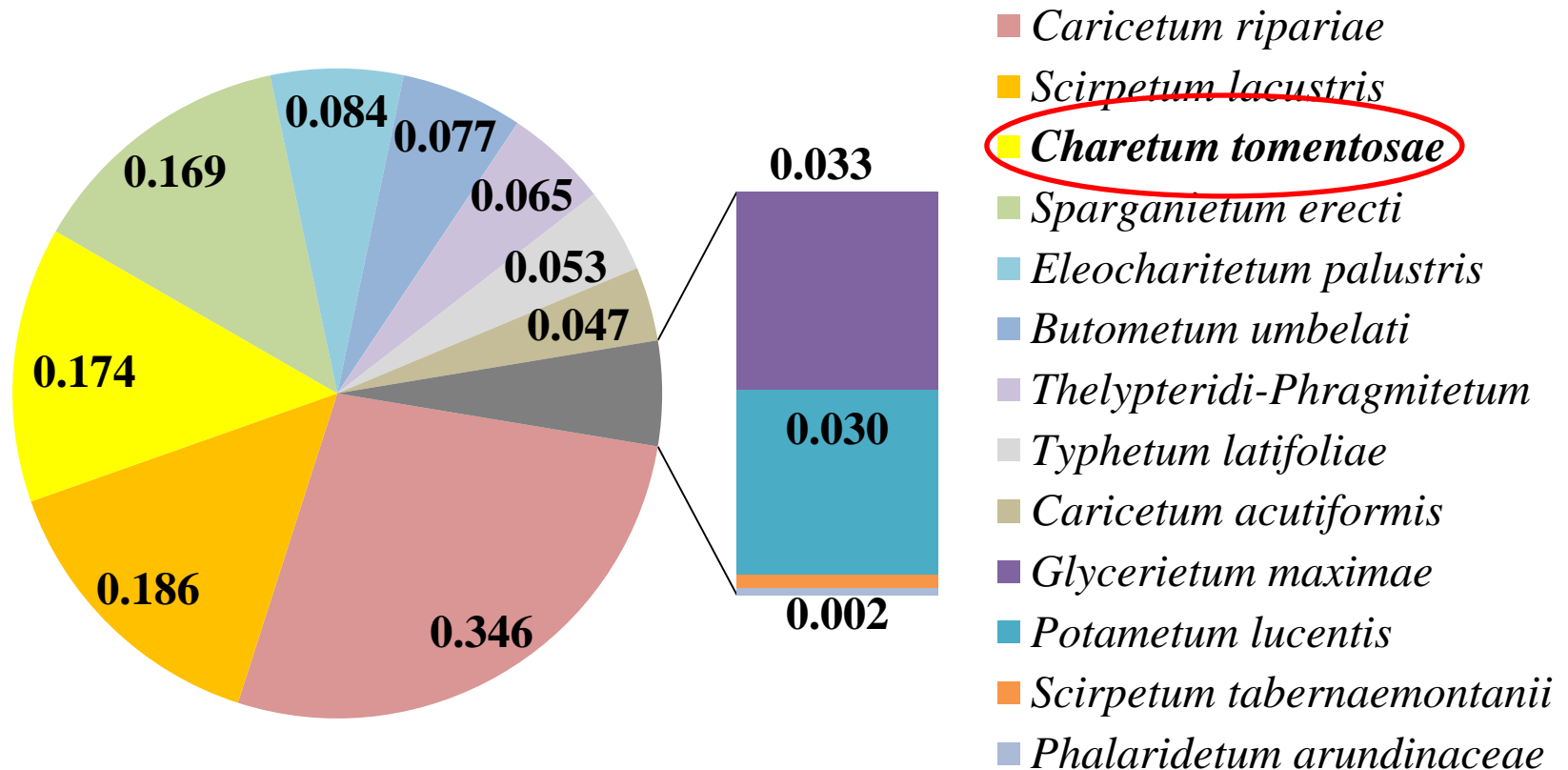
Potametum perfoliati



(Photos by Gast and Qu, 2015)

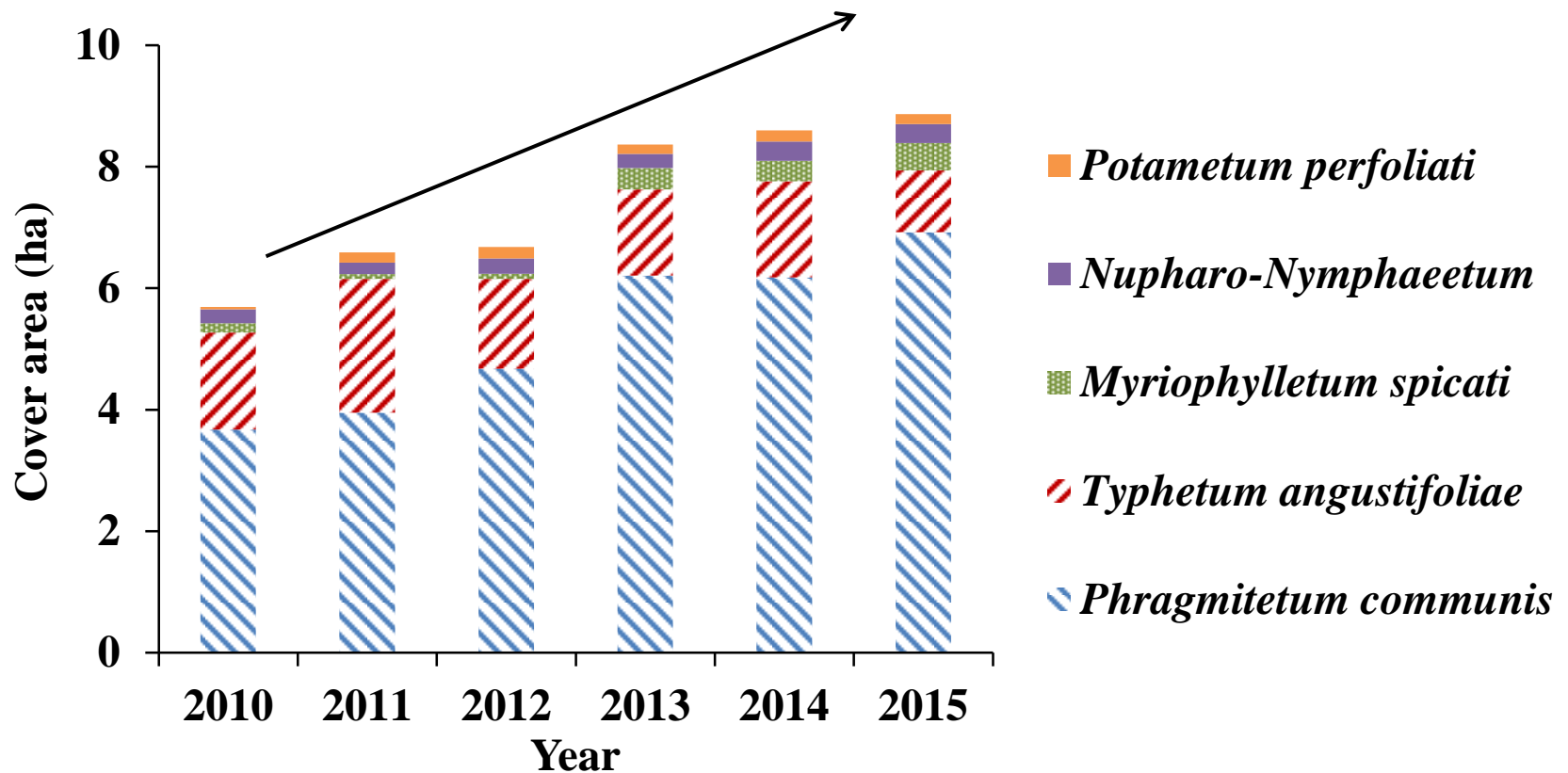
Result

Other macrophytes communities in Lake Durowskie



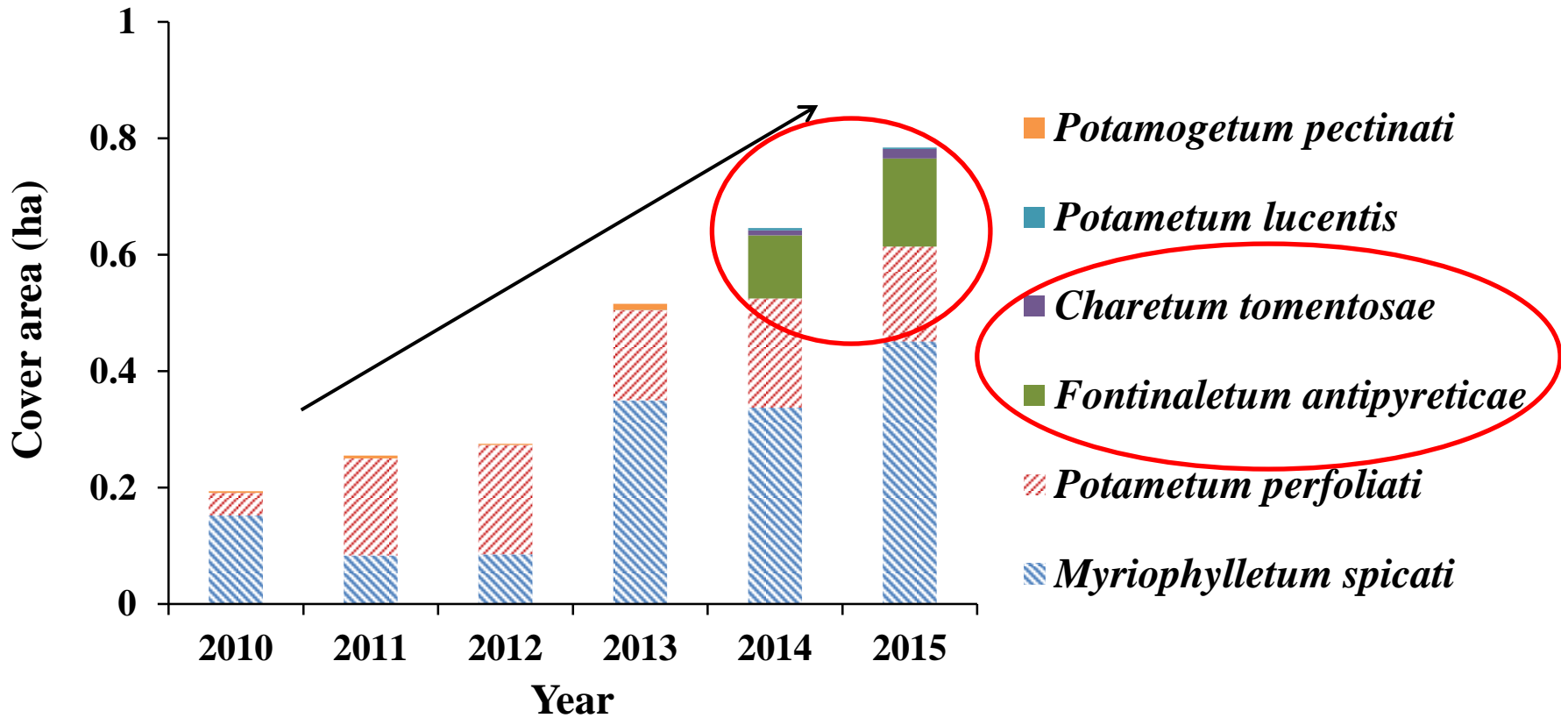
Result

Variation of dominant communities' cover area



Result

Variation of submerged communities' cover area



Result

Ranges of ESMI and MIR for ecological states

Ecological state	ESMI	MIR
very good	0,680 - 1,000	$\geq 44,5$
good	0,340 - 0,679	44,5 - 35,0
moderate	0,170 - 0,339	35,0 - 25,4
poor	0,090 - 0,169	25,4 - 15,8
bad	$< 0,090$	$< 15,8$

Comparison of IR and ESMI with previous years

	2009	2010	2011	2012	2013	2014	2015
ESMI	0.109	0.103	0.118	0.12	0.136	0.149	0.142
MIR	30.6	31.7	29.8	33.41	26.05	28.95	36.36

Conclusion

- ✓ Submerged macrophytes show an **increase** both on communities and cover area;
- ✓ Based on macrophytes indicator(ESMI) in the lake, it shows a poor ecological state of the lake;
- ✓ However, based on indicator(MIR) at the outlet of the lake, it reaches to **good** condition in this year;
- ✓ It is advisable to maintain good water transparency in following spring, for a better growing of submerged macrophytes.

Acknowledgement



**Thanks to our instructor Prof. Goldyn,
and the help from each group.**



*Thanks for
your attention!*

