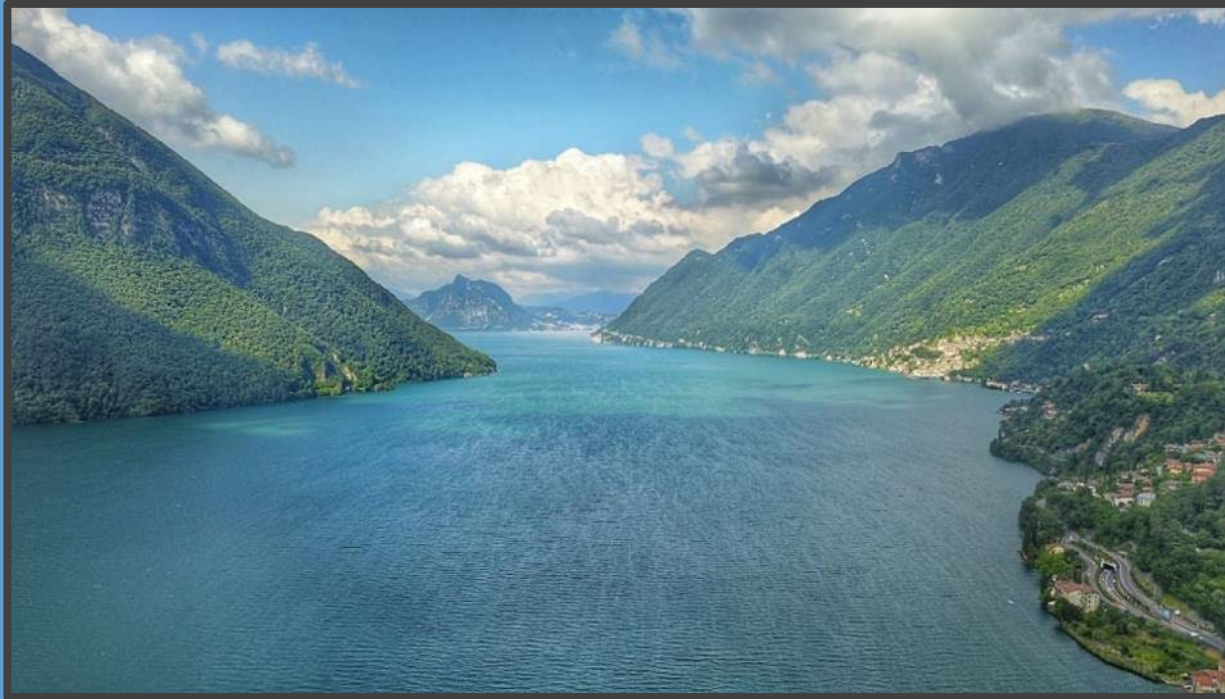


MICROPLASTICHE IN LAGHI E FIUMI

Quale è la situazione?

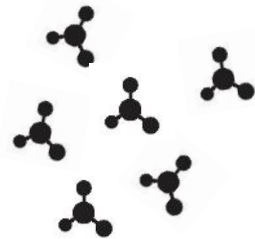


COSA È LA PLASTICA?

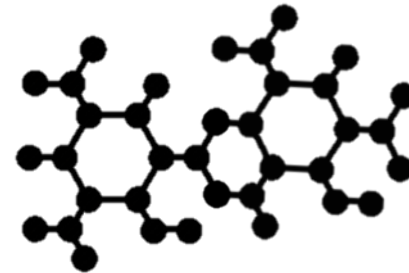
Materiale sintetico composto da macro molecole (polimeri), formate da unità ripetute (monomeri) legate tra loro in lunghe catene



combustibile
fossile

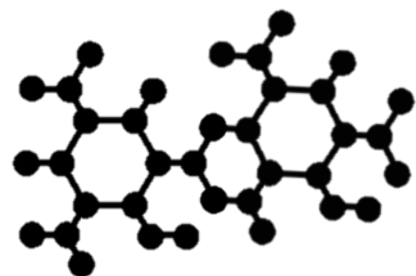


monomeri

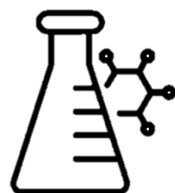


polimeri

QUALI TIPOLOGIE ESISTONO?



polimeri



additivi



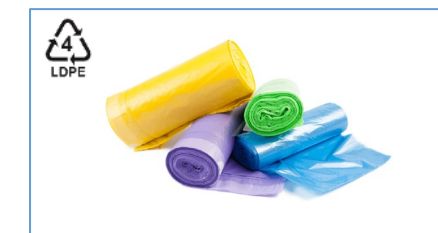
PET



HDPE



PVC



LDPE

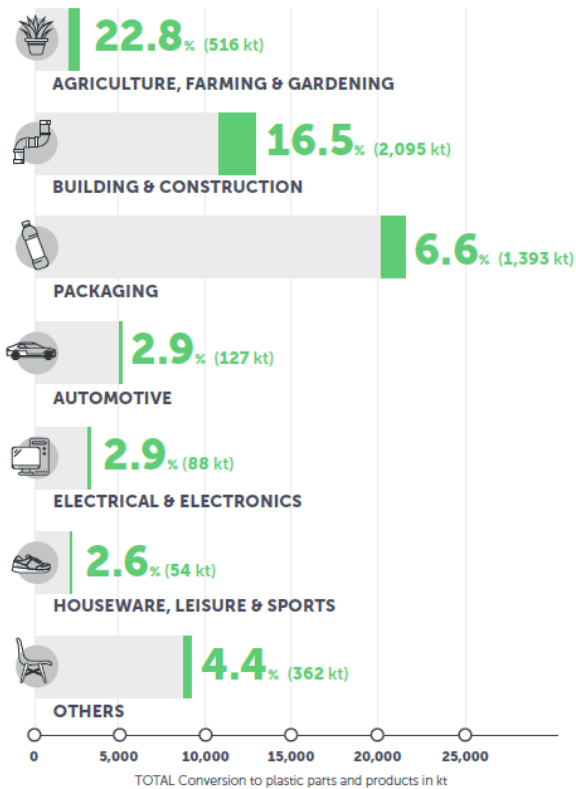


PP

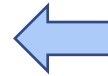
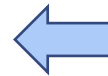
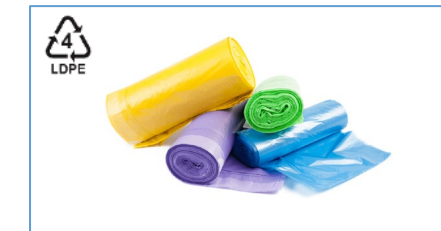


PS

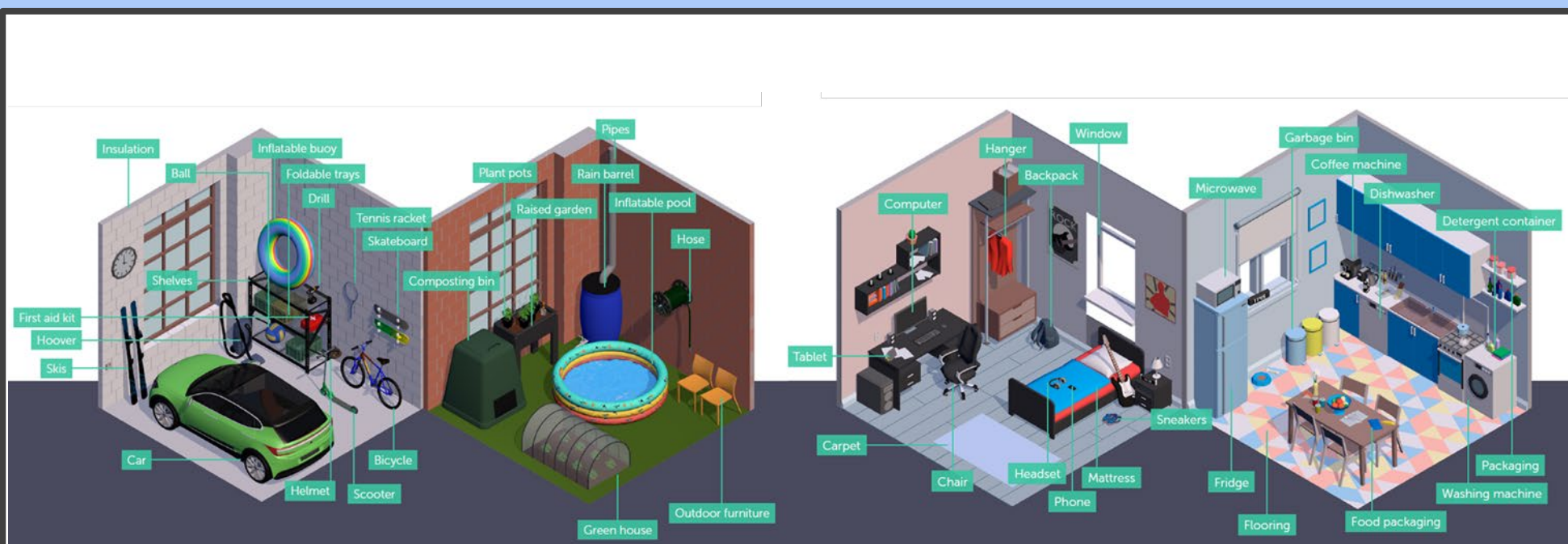
PER QUALI UTILIZZI?



(PlasticsEurope, Plastics – The Fact 2022)

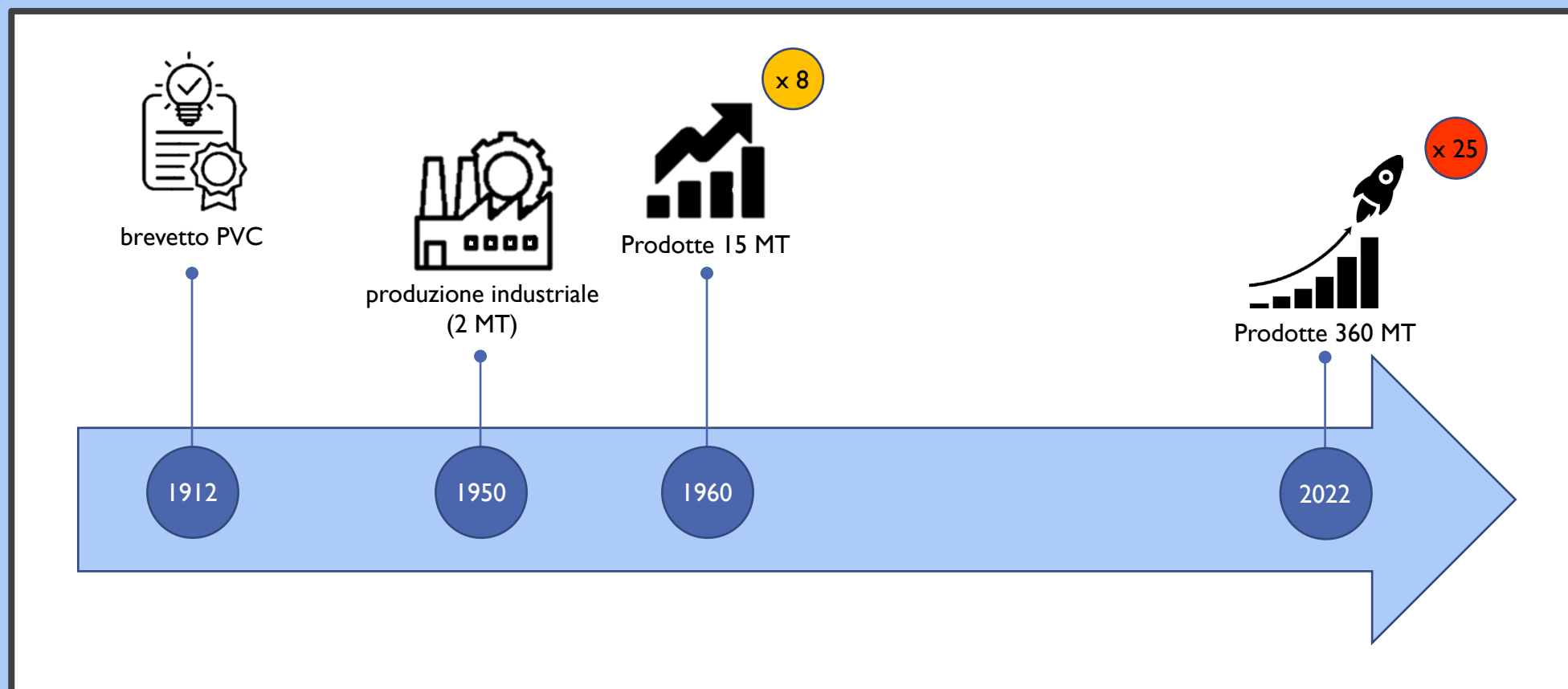


DOVE LA TROVIAMO?

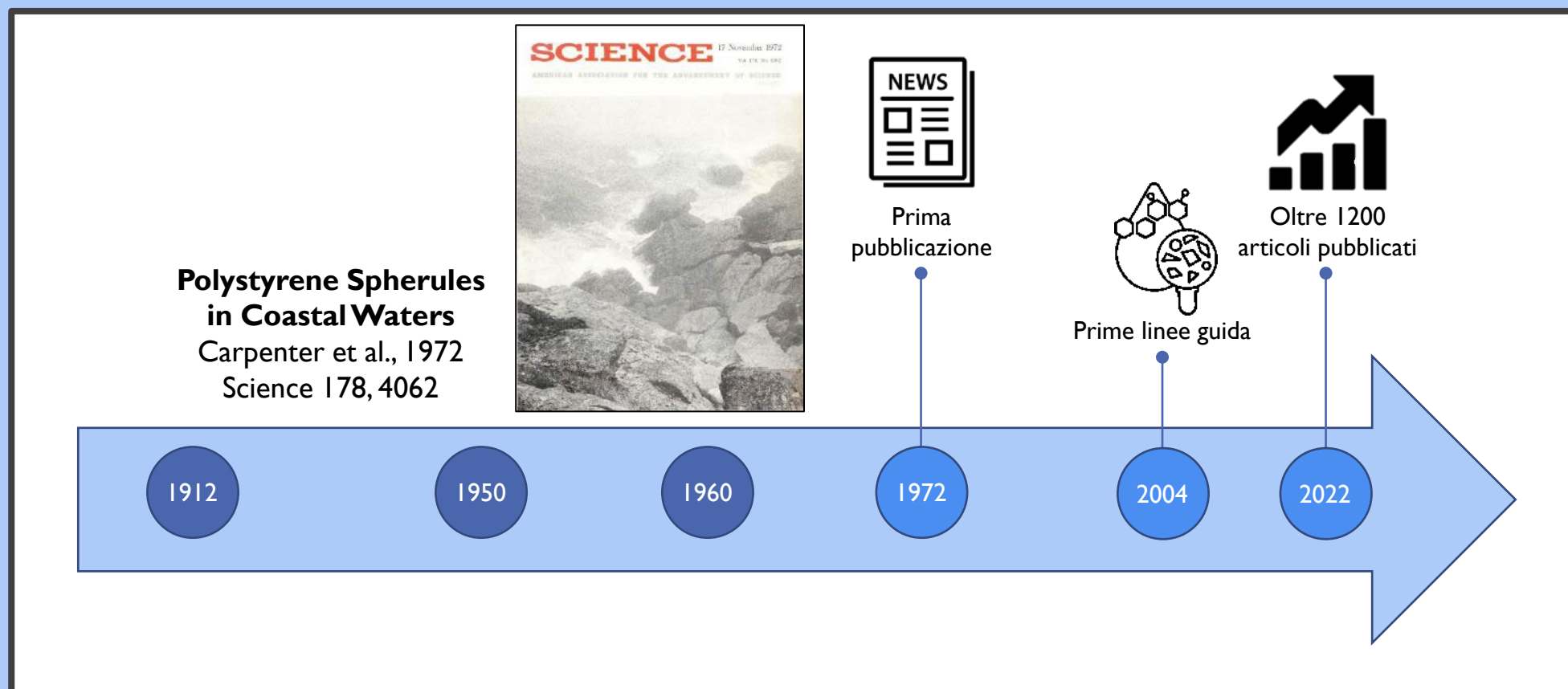


(Modificata da PlasticsEurope, Plastics – The Circular Economy for Plastic 2022)

LA PLASTICA COME PRODOTTO...



... E COME CONTAMINANTE

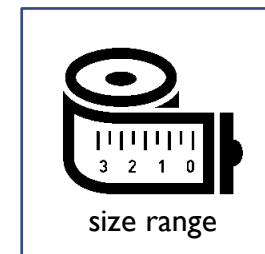
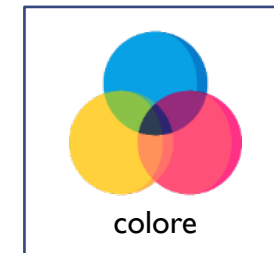
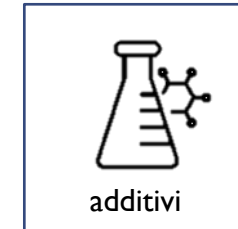
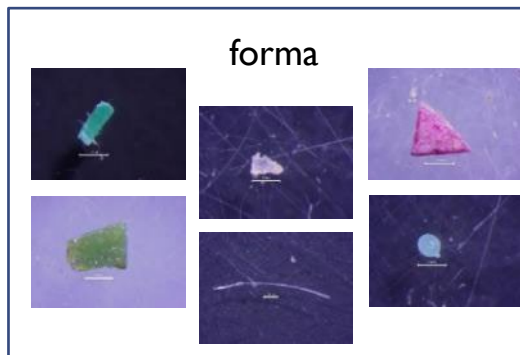
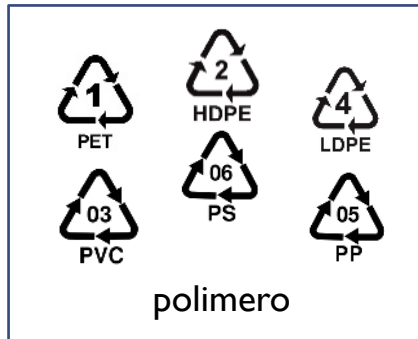


LE MICROPLASTICHE



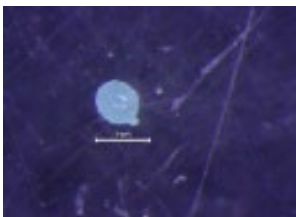
Particelle plastiche con
dimensione inferiore a
5 mm

LE MICROPLASTICHE



MICROPLASTICHE PRIMARIE

Microsfere



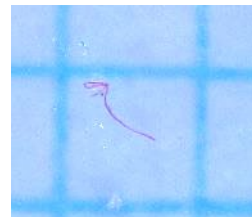
4 000 per
singolo uso
(Napper et al., 2016)

Pellet



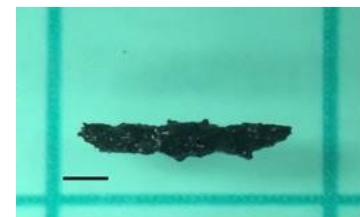
3 milioni di
tonnellate l'anno
(Karlsson et al., 2018)

Microfibre



700 000 per
singolo carico
(Cheung et al., 2017)

Tyre Wear



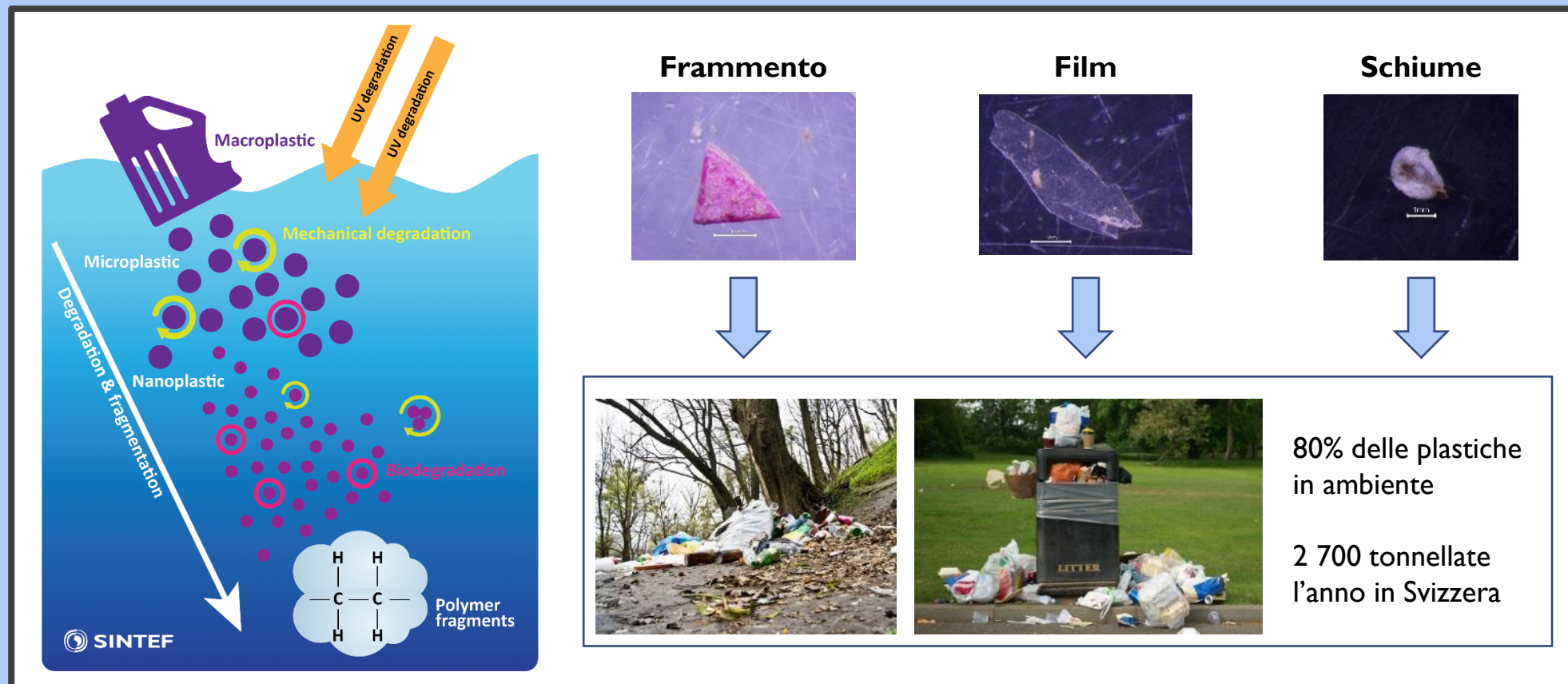
9 000 tonnellate
l'anno in Svizzera
(UFAM, 2020)

MICROPLASTICHE PRIMARIE

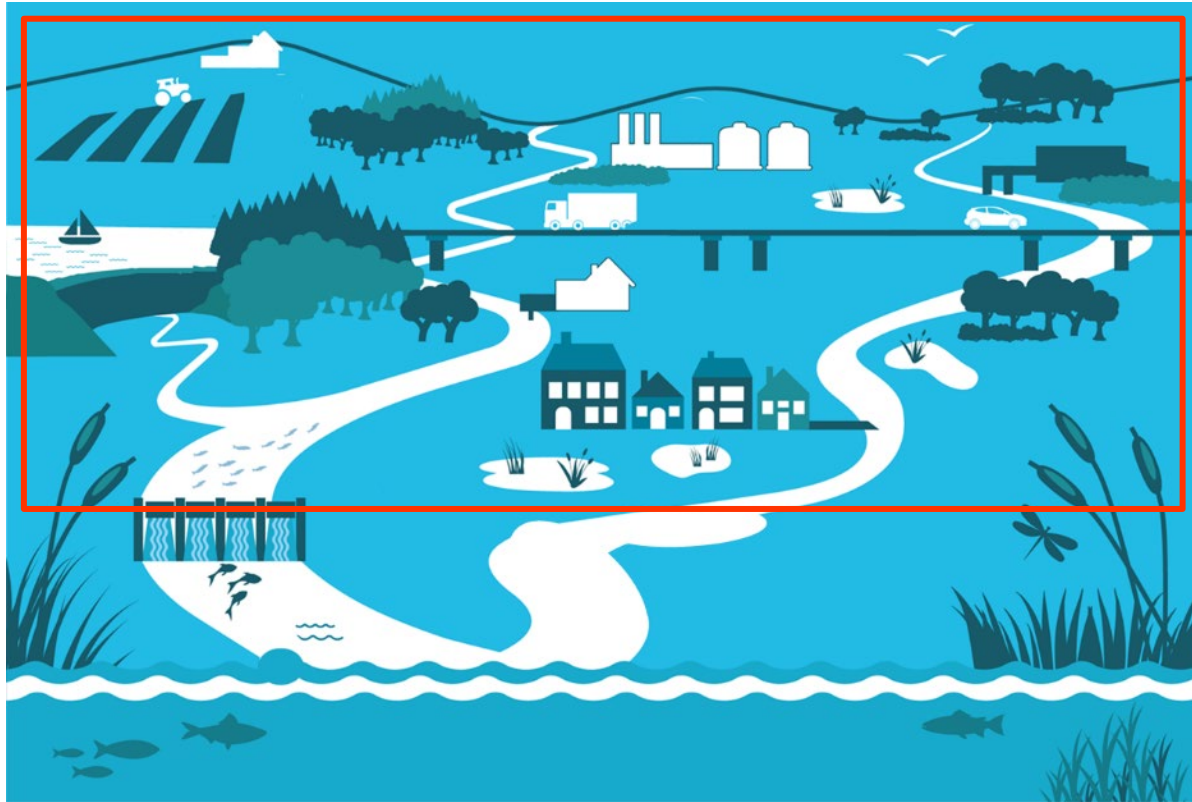


- 1) Attività industriali
- 2) Economie domestiche
- 3) Abrasione pneumatici
- 4) Produzione, trasporto, uso

MICROPLASTICHE SECONDARIE



MICROPLASTICHE SECONDARIE



- 1) Stoccaggio
- 2) Utilizzo
- 3) Littering
- 4) Run-off urbano

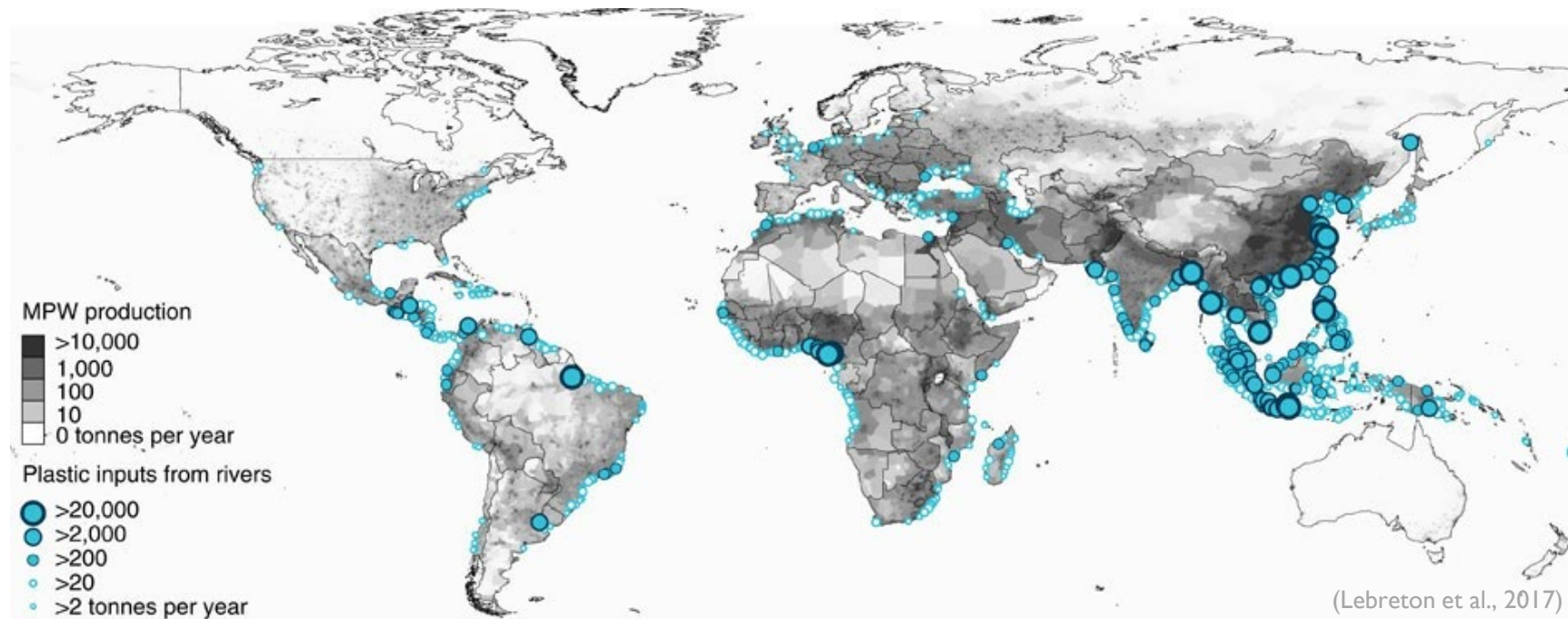
MICROPLASTICHE NELL'AMBIENTE



Ogni anno vengono rilasciate nelle acque superficiali svizzere circa 110 tonnellate di macroplastiche e 15 tonnellate di microplastiche

(UFAM., 2020)

PLASTICHE E FIUMI



Contribuiscono al trasporto da 6000 a 1.5 milioni di tonnellate l'anno, l'equivalente dell'80% di tutta la plastica presente sulla superficie degli oceani (D'Avignon et al., 2022)

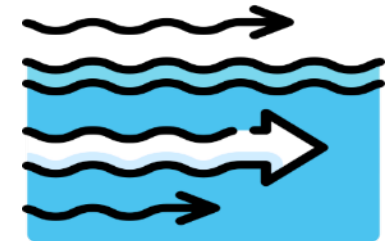
PLASTICHE E FIUMI



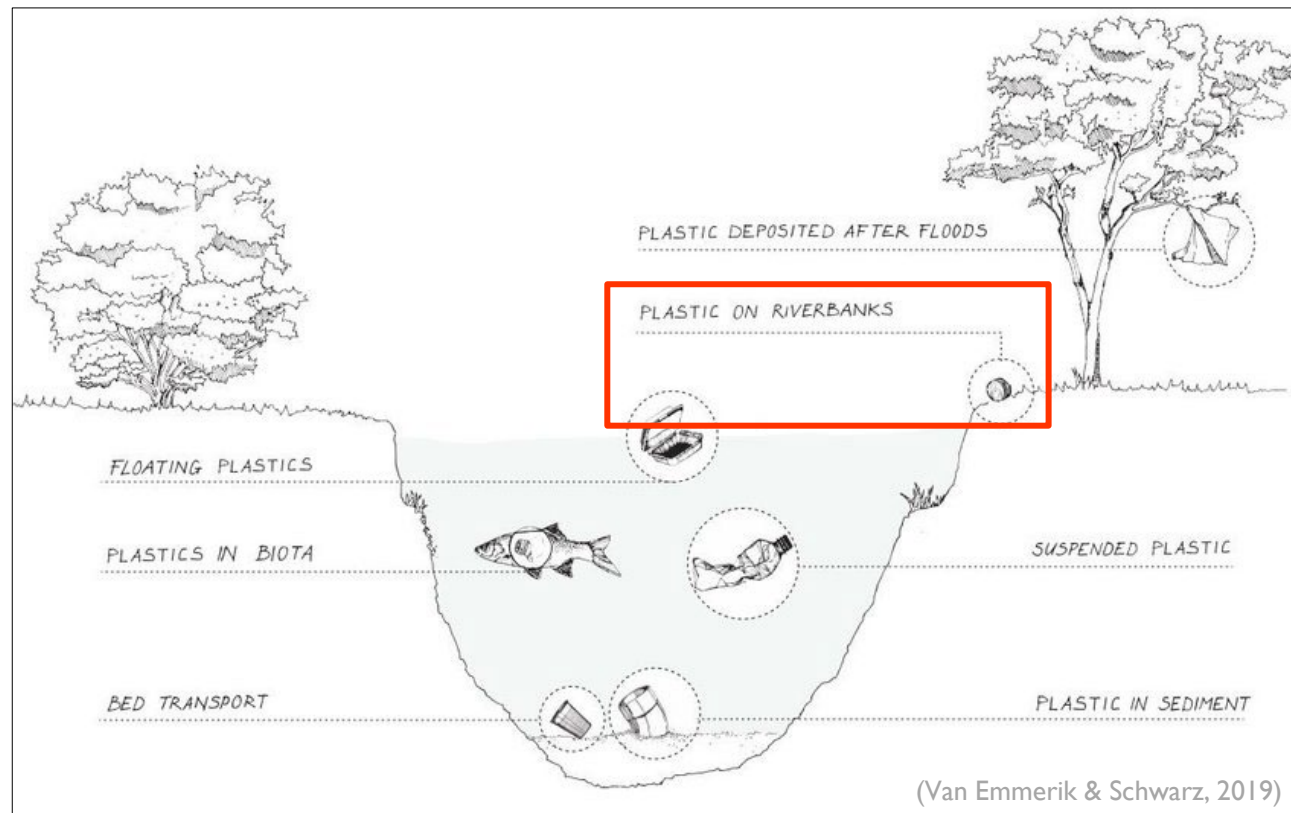
Ticino: 33 microplastiche m⁻³
(Winkler et al., 2022)



Microplastiche
trasportate nelle
acque dei fiumi



PLASTICHE E FIUMI

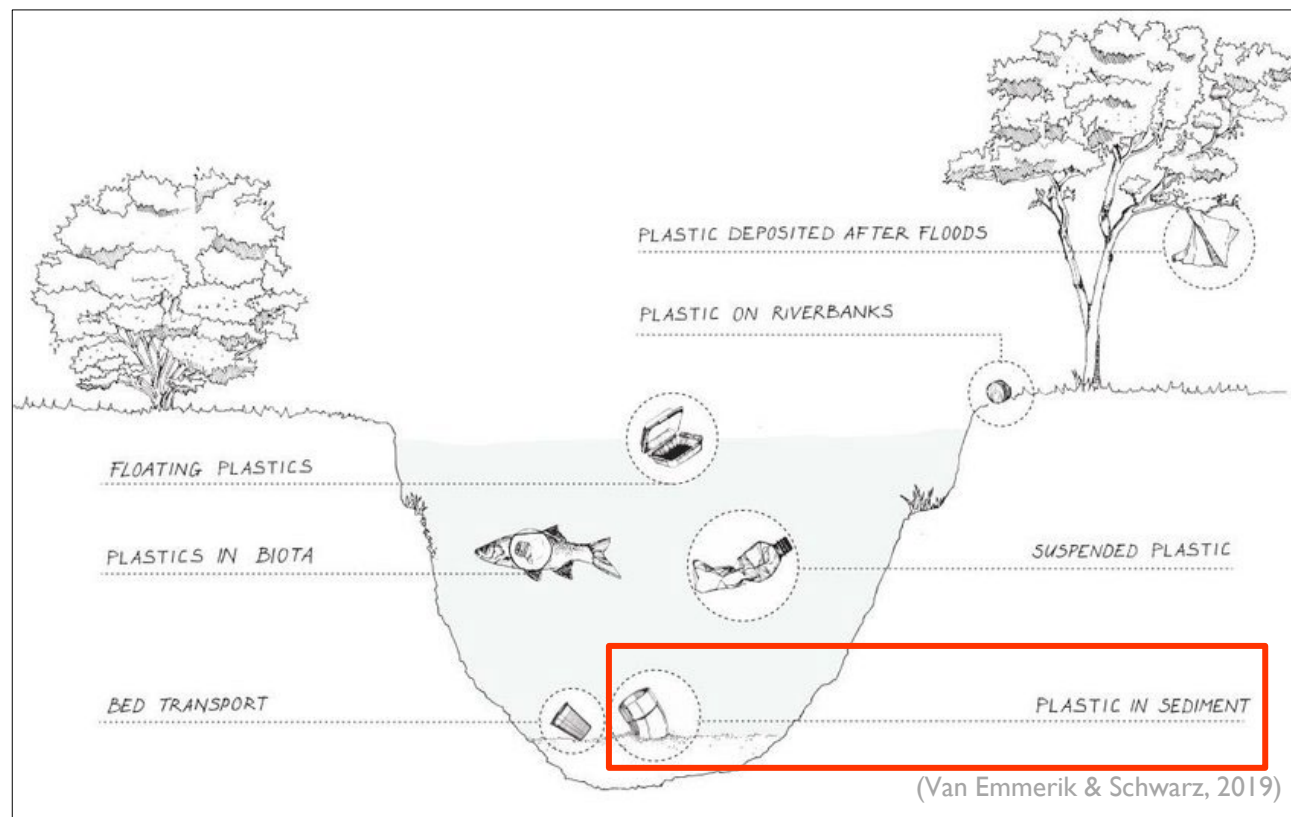


(Micro)plastiche
accumulate lungo
gli argini dei fiumi



concentrazioni 5-10
volte superiori a quelle
osservate sulle spiagge
costiere (D'Avignon et al., 2022)

PLASTICHE E FIUMI

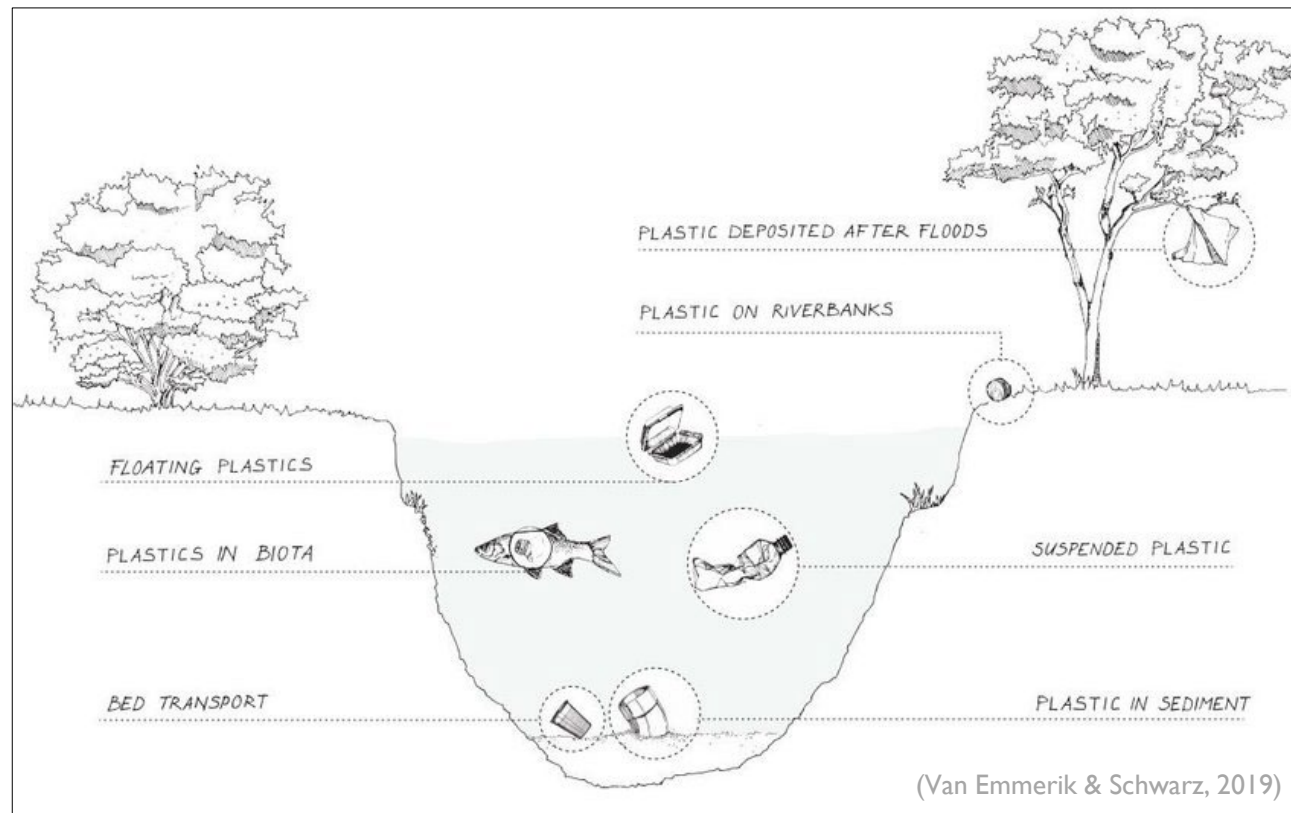


(Micro)plastiche
accumulate nei
sedimenti dei fiumi



concentrazioni 5 volte
superiori a quelle
osservate nell'acqua
(D'Avignon et al., 2022)

PLASTICHE E FIUMI



Acqua: 1.3 microplastiche m^{-3}
(Mani et al., 2016)

Rive: 2000 microplastiche kg^{-1}
(Klein et al., 2015)

Fondo: 6000 microplastiche kg^{-1}
(Mani et al., 2019)

PLASTICHE E FIUMI

Elevata variabilità



Caratteristiche
sito specifiche

Bacino idrografico
Portata
Morfologia del substrato

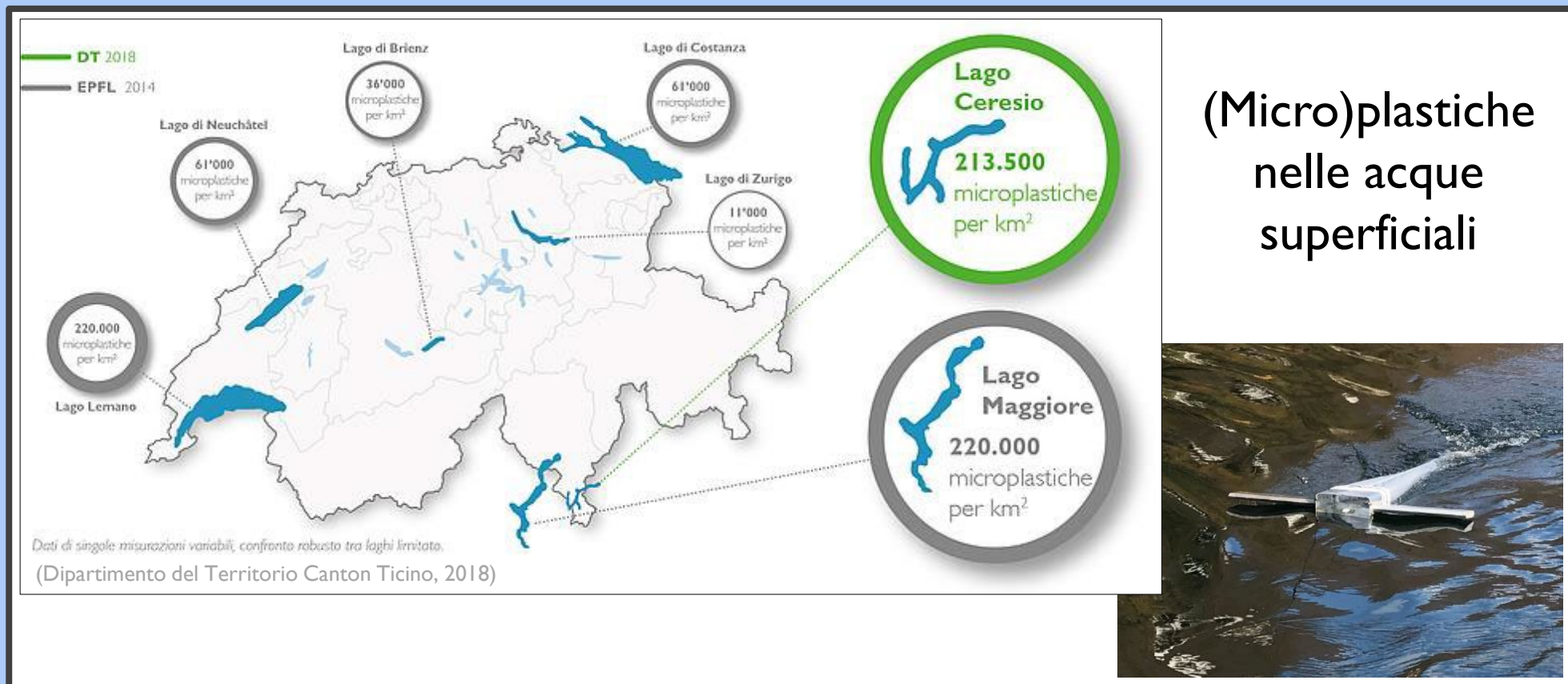
Variazioni
temporali

Stagionalità
Eventi di piena

Presenza
antropica

Uso del territorio
Urbanizzazione
Impianti di depurazione

MICROPLASTICHE E LAGHI



MICROPLASTICHE E LAGHI



Monitoraggio 2020
270 000 microplastiche km^{-2}

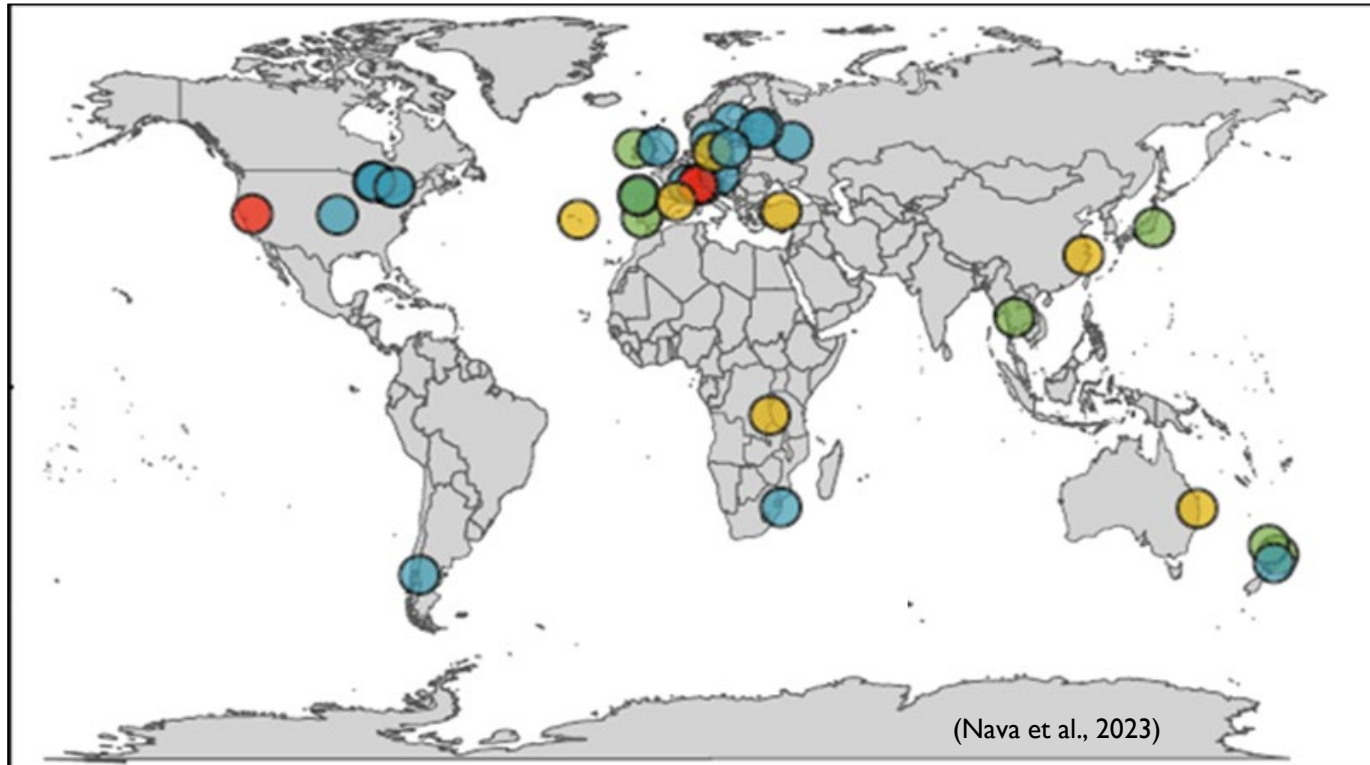
(SUPSI-IST / Dipartimento Territorio, 2020)



BACINO NORD
300 000 plastiche km^{-2}
Concentrazioni variabili
Frammenti

BACINO SUD
200 000 plastiche km^{-2}
Concentrazioni costanti
Filamenti

MICROPLASTICHE E LAGHI



38 laghi

Analisi con metodo
standardizzato



Microplastiche in
tutti i laghi

MICROPLASTICHE E LAGHI



Concentrazioni
paragonabili a quelle
osservate nei mari



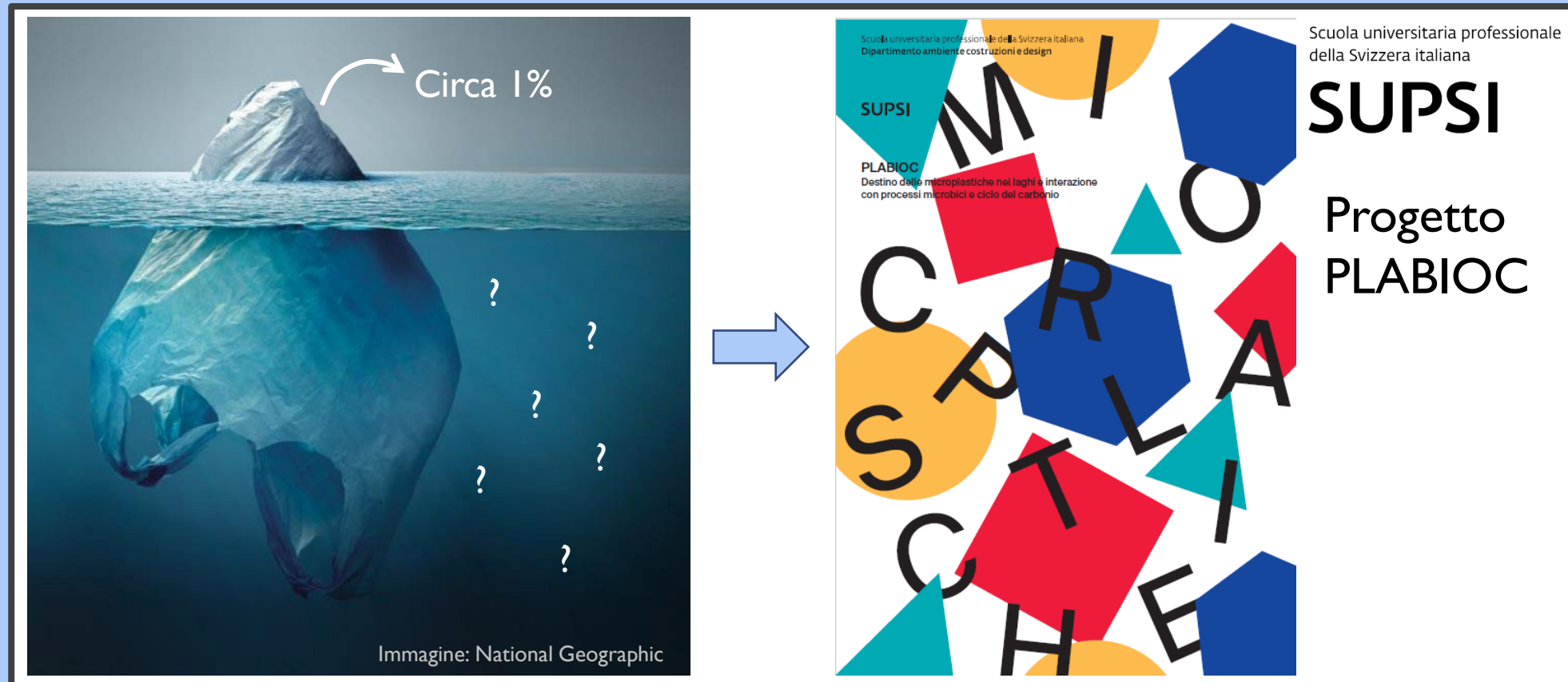
MICROPLASTICHE E LAGHI



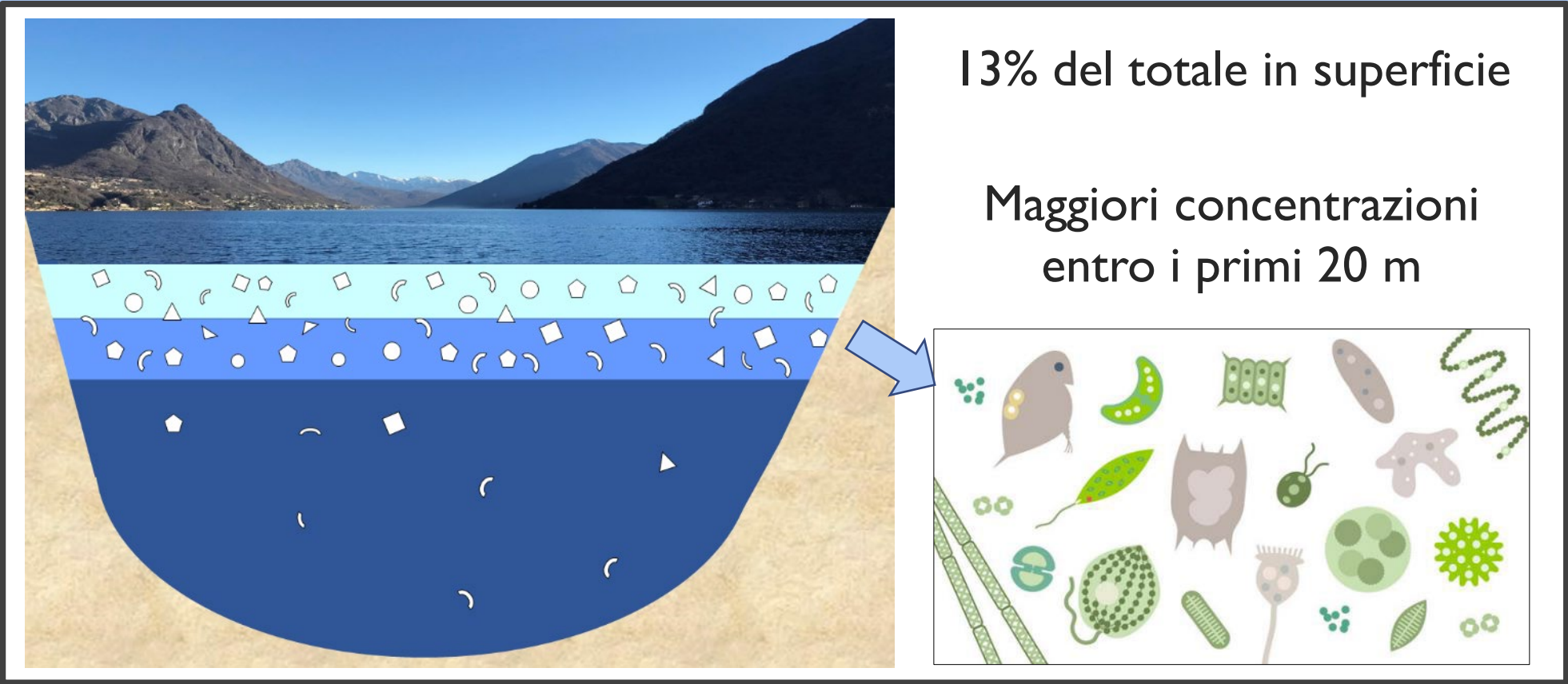
MICROPLASTICHE E LAGHI



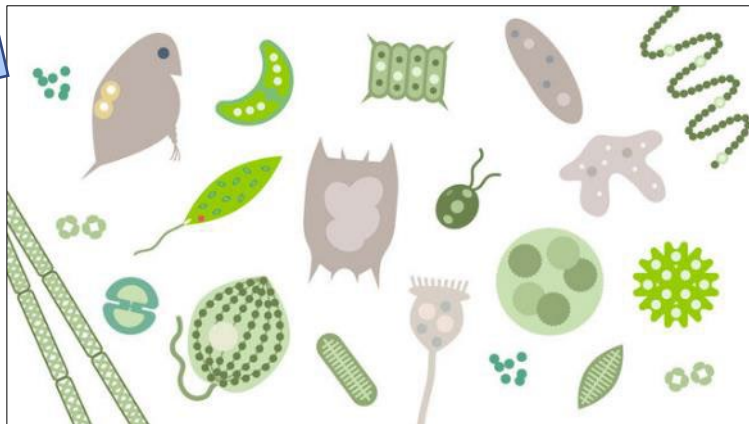
MICROPLASTICHE E LAGHI



MICROPLASTICHE E LAGHI



Maggiori concentrazioni
entro i primi 20 m

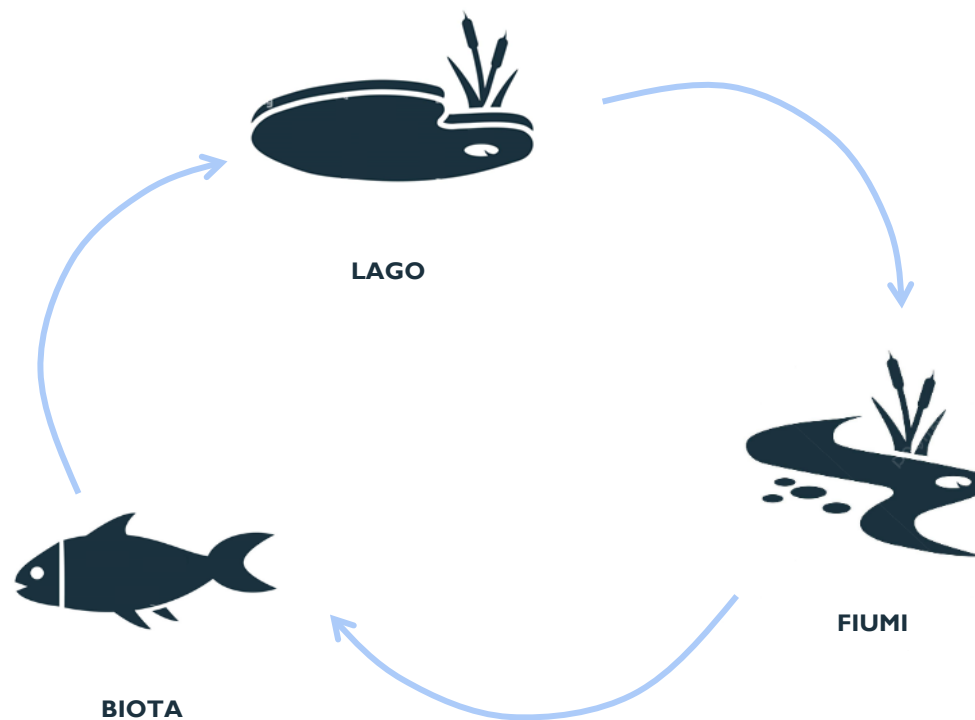


RICERCA E MONITORAGGIO



Scuola universitaria professionale
della Svizzera italiana

SUPSI



QUALI AZIONI POSSIBILI?

(1) Rafforzare l'economia circolare

(2) Sviluppo di nuove tecnologie

(3) Ridurre la dispersione in ambiente

(4) Ridurre l'utilizzo di plastiche dove non necessario



