

Taller de Restauración y Mejora Ambiental

Revisión Plan Hidrológico Cantábrico Oriental



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Donostia, 03-03-2020

Crisis ~~climática~~ ambiental

Una tendencia muy preocupante
Se nos acaba el tiempo para reaccionar

World Scientists' Warning to Humanity: A Second Notice

WILLIAM J. RIPPLE, CHRISTOPHER WOLF, THOMAS M. NEWSOME, MAURO GALETTI, MOHAMMED ALAMGIR, EILEEN CRIST, MAHMOUD I. MAHMOUD, WILLIAM F. LAURANCE, and 15,364 scientist signatories from 184 countries

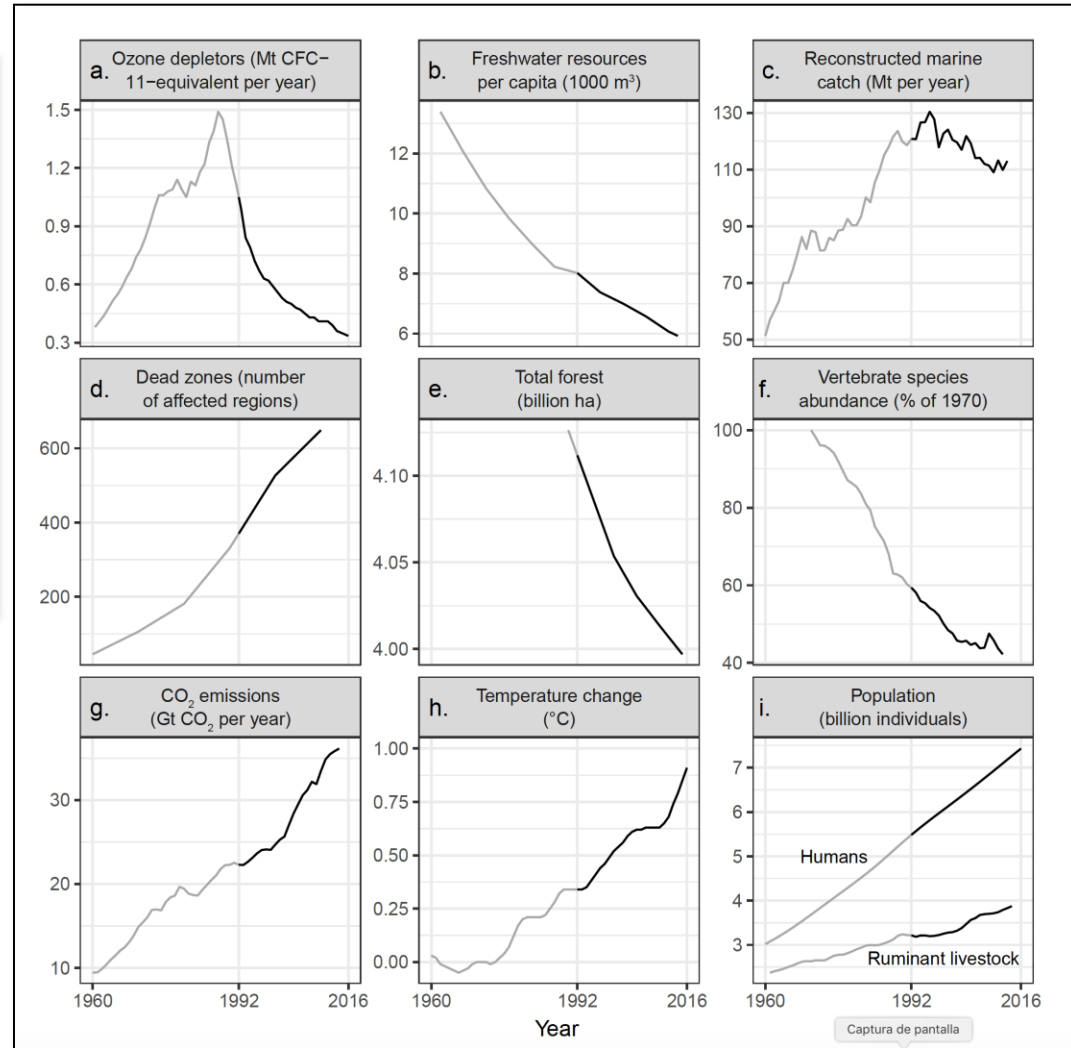
Twenty-five years ago, the Union of Concerned Scientists and more than 1700 independent scientists, including the majority of living Nobel laureates in the sciences, penned the 1992 "World Scientists' Warning to Humanity" (see supplemental file S1). These concerned professionals called on humankind to curtail environmental destruction and cautioned that "a great change in our stewardship of the Earth and the life on it is required, if vast human misery is to be avoided." In their manifesto, they showed that humans were on a collision course with the natural world. They expressed concern about current, impending, or potential damage on planet Earth

deforestation, and reverse the trend of collapsing biodiversity.

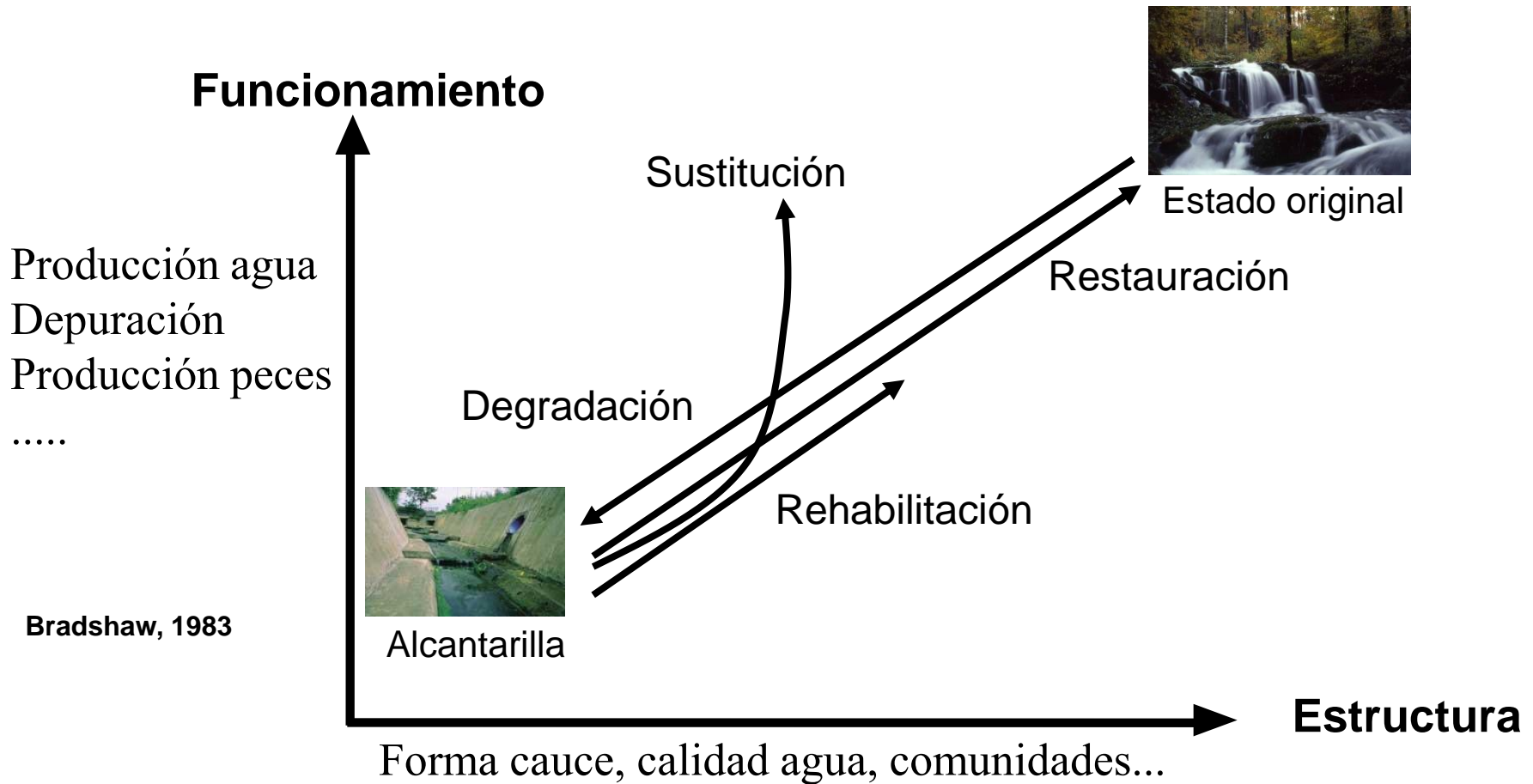
On the twenty-fifth anniversary of their call, we look back at their warning and evaluate the human response by exploring available time-series data. Since 1992, with the exception of stabilizing the stratospheric ozone layer, humanity has failed to make sufficient progress in generally solving these foreseen environmental challenges, and alarmingly, most of them are getting far worse (figure 1, file S1). Especially troubling is the current trajectory of potentially catastrophic climate change due to rising GHGs from burning fossil fuels (Hansen et al. 2013), deforestation (Keenan et al.

the urgent steps needed to safeguard our imperilled biosphere.

As most political leaders respond to pressure, scientists, media influencers, and lay citizens must insist that their governments take immediate action as a moral imperative to current and future generations of human and other life. With a groundswell of organized grassroots efforts, dogged opposition can be overcome and political leaders compelled to do the right thing. It is also time to re-examine and change our individual behaviors, including limiting our own reproduction (ideally to replacement level at most) and drastically diminishing our *per capita* consumption of fossil fuels, meat, and



La restauración ecológica



- ✓ Afinar en nuestra imagen-objetivo
- ✓ Atender a la estructura y funcionamiento

El estado de referencia

Difícil de determinar en Europa
Marca la dificultad de nuestros objetivos...
...y el estado final que alcancemos



El estado de referencia

- ✓ Estudiar más a fondo nuestros mejores ríos
- ✓ Evaluar el efecto del cambio climático vs cambio ambiental



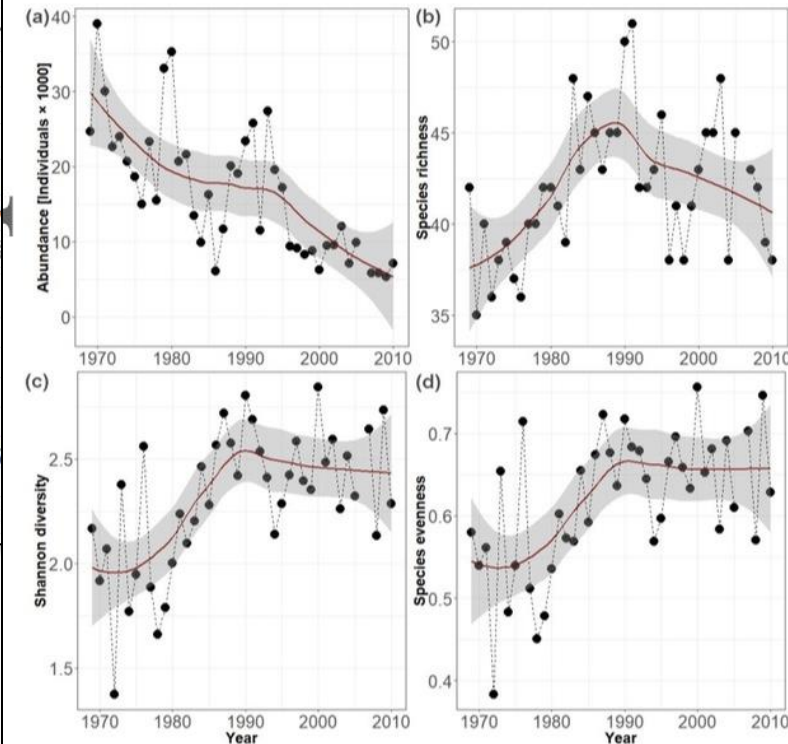
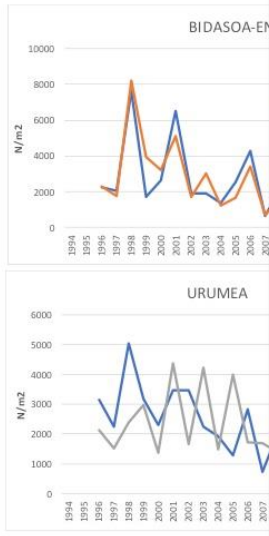
Artikutza, laboratorio natural
Cada vez en mejor estado
Sitio de obligada visita para gestores
¿Estación de seguimiento climático?

Efectos del cambio climático

- ✓ Series largas de química y biología...
- ✓ ...parece bajar la densidad de invertebrados aún en sitios limpios, no sabemos por qué



ORNOGABEEN DENTSIKATEAREN BILAKAERA EKIALDEAN



Complex and nonlinear climate-driven changes in freshwater insect communities over 42 years

Viktor Baranov^{1,2}, Jonas Jourdan^{1,3}, Francesca Pilotto^{1,4}, Rüdiger Wagner⁵, Peter Haase^{1,6}

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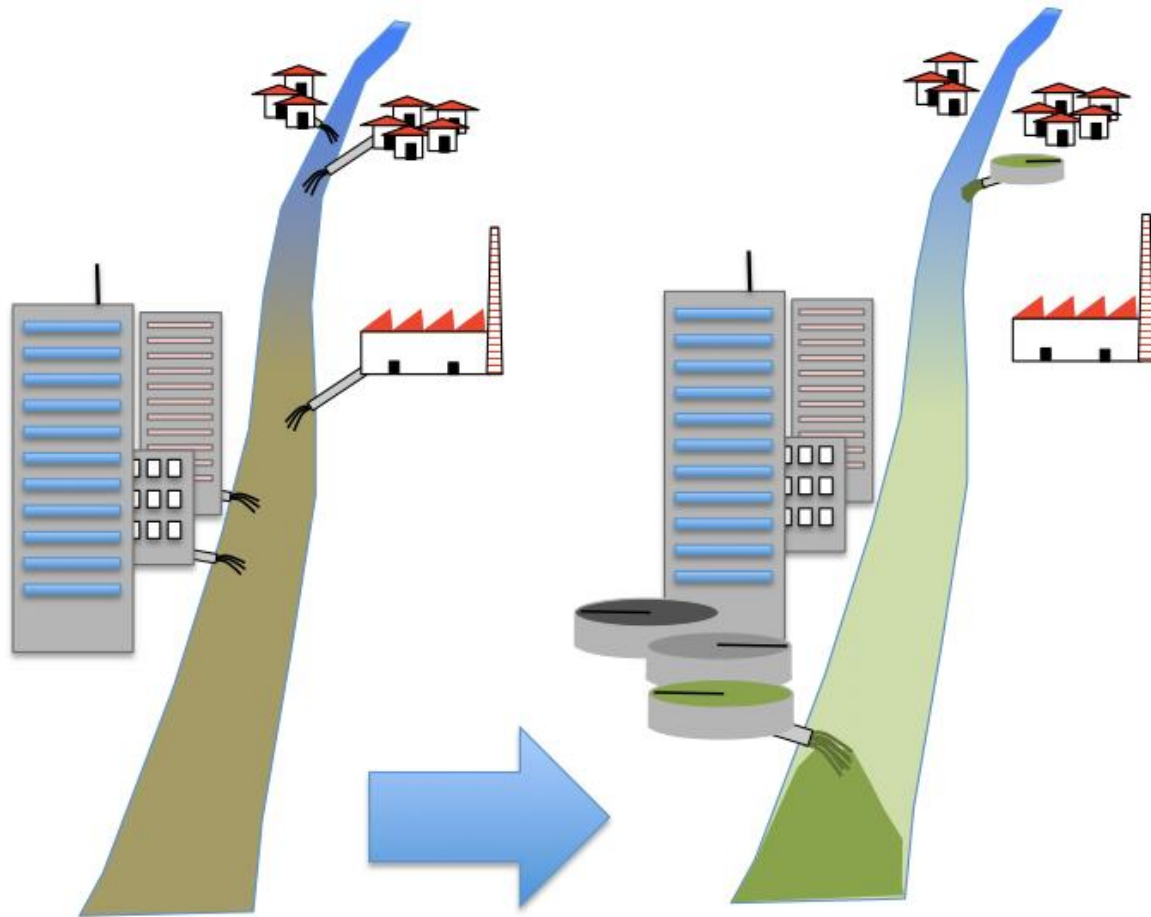
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La contaminación “de fondo”

Las depuradoras han permitido mejorar mucho la calidad del agua
Pero sus efluentes son cócteles complejos
Efectos ambientales difíciles de precisar
(no hay control/impacto claro)



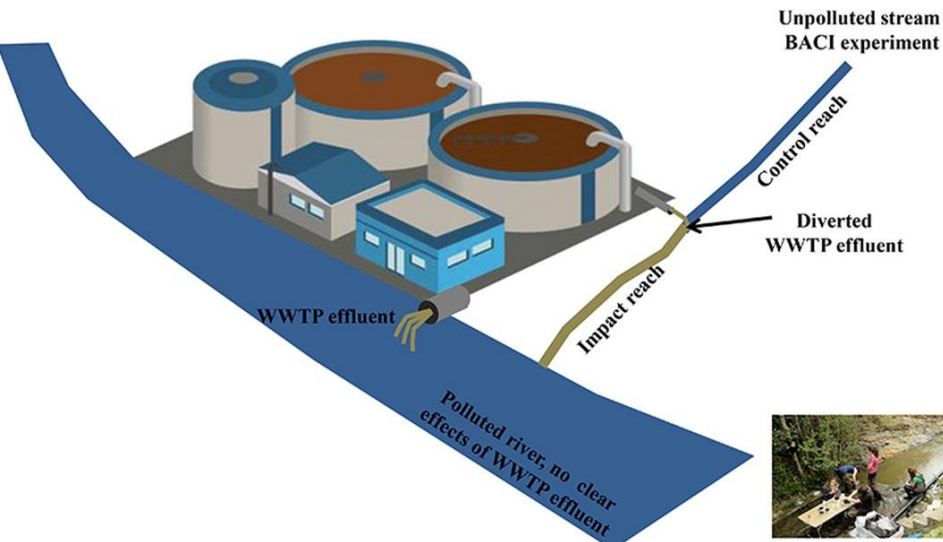
Un experimento manipulativo

Experimento BACI (Before/After, Control/Impact)

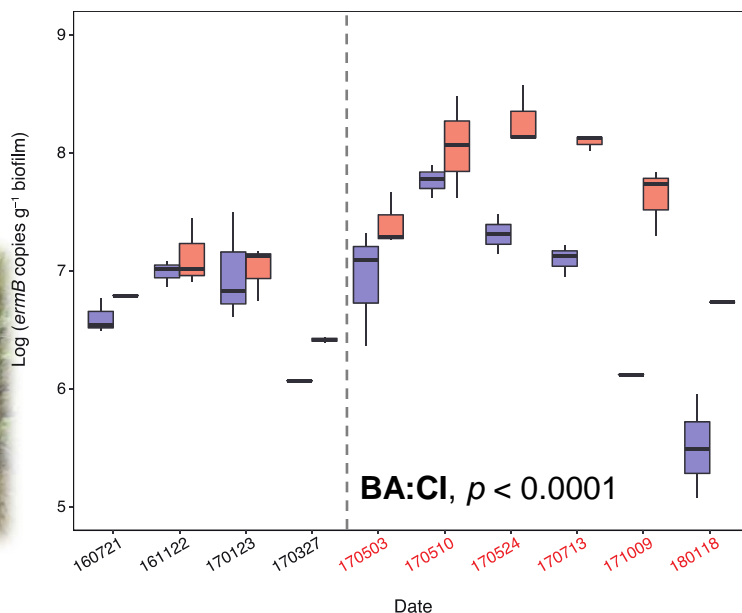
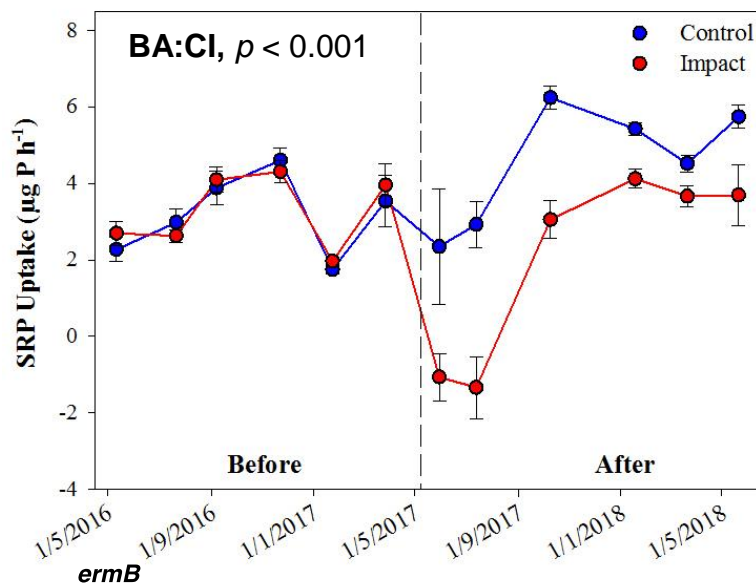
Desviar efluente, contaminar 100 m finales de un arroyo limpio, dilución 4%
1 año antes, 1 año después

Muestreo bimensual

- ✓ Comunidades: microbios, algas, invertebrados, peces
- ✓ Funcionamiento ecosistema
- ✓ Genes de resistencia a antibióticos
- ✓ ...



Efectos del efluente de depuradoras



Reducen la capacidad de autodepuración

Environmental Pollution 258 (2020) 113719

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Impact of wastewater effluent pollution on stream functioning: A whole-ecosystem manipulation experiment*

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ARTICLE INFO

ABSTRACT

The ecological effects of wastewater treatment plant (WWTP) effluents on stream ecosystems cause growing concern. However, it is difficult to assess these effects as most streams receiving WWTP effluents are also affected by other stressors. We performed a whole-ecosystem manipulation experiment following a BACI design (Before-After/Control-impact) in order to exclude the influence of other potentially confounding factors. We diverted part of the effluent of a large tertiary urban WWTP into a small, unpolluted stream, and studied its effects on ecosystem structure and functioning over two years (i.e. one year before and one year after the effluent diversion). Although highly diluted (final concentration in the receiving stream averaged 3%), the effluent promoted biofilm chlorophyll-*a* and biomass (2.3 and 2.1 times, respectively), exo-enzymatic activities (phosphatase 2.2 and glucosidase 4.2 times) and invertebrate-mediated organic matter decomposition (1.4 times), but reduced phosphorus uptake capacity of the epilithic biofilm down to 0.5 of the initial values. Biofilm metabolism, reach-scale nutrient uptake and microbially-mediated organic matter decomposition were not affected. Our results indicate that even well treated and highly diluted WWTP effluents can also affect the structure of the biofilm community and stream ecosystem functioning.

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Aumentan la cantidad de genes de resistencia a antibióticos



Integrando objetivos

- ✓ La restauración hidromorfológica puede ayudar a mejorar el estado químico



Article

Incorporating In-Stream Nutrient Uptake into River Management: Gipuzkoa Rivers (Basque Country, North Spain) as a Case Study

Maddi Altuna¹, **Eugènia Martí**², **Francesc Sabater**³, **José Ramón Díez**⁴ , **Joan Lluís Riera**³, **Félix Izco**⁵ and **Arturo Elosegi**^{1,*} 

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Received: 8 February 2019; Accepted: 6 May 2019; Published: 11 May 2019



De dónde venimos



Tolosa ≈ 1968



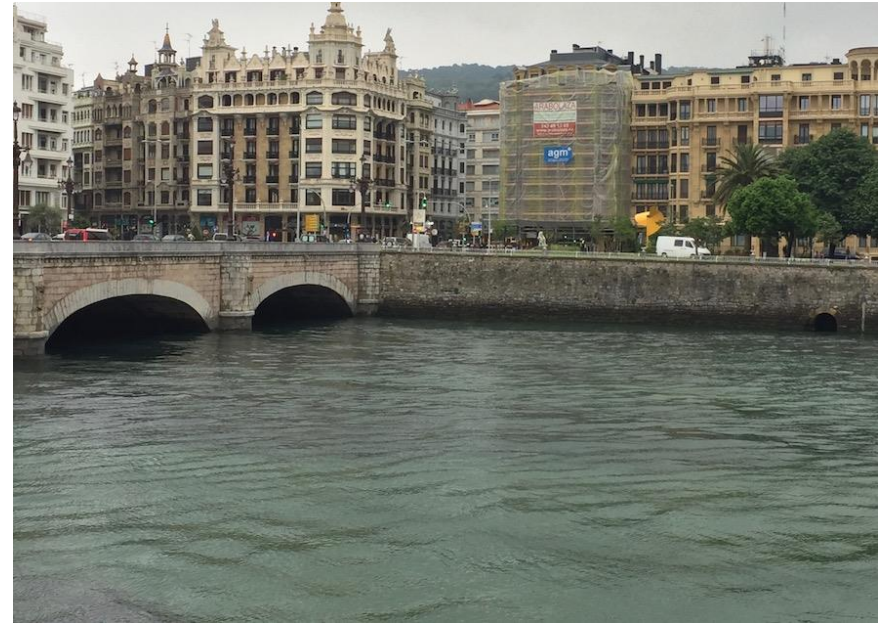
Orio 1968

Una sociedad que no cuida su medio ambiente
no cuida de sí misma

¡Cuánto hemos cambiado!



Donostia ≈ 1960

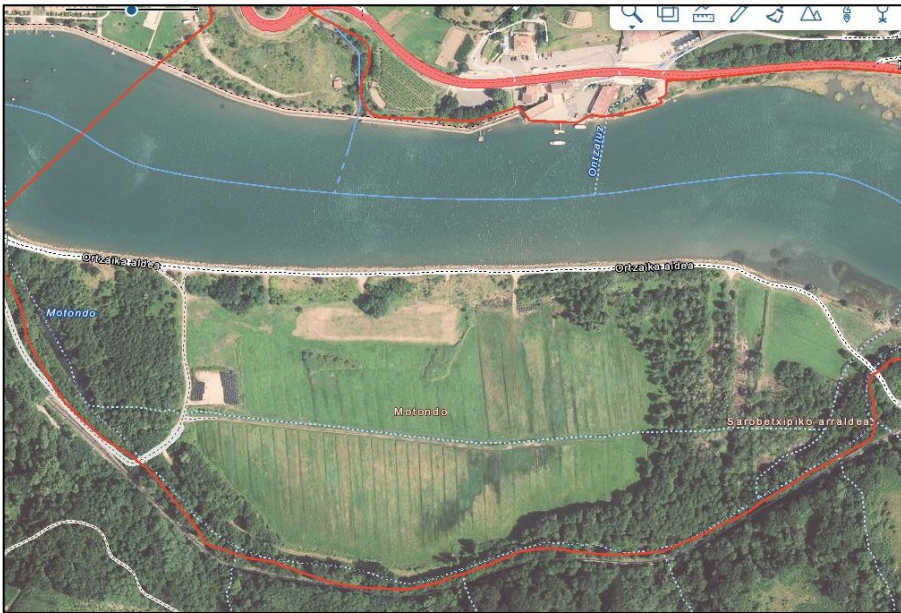


Donostia, 2018

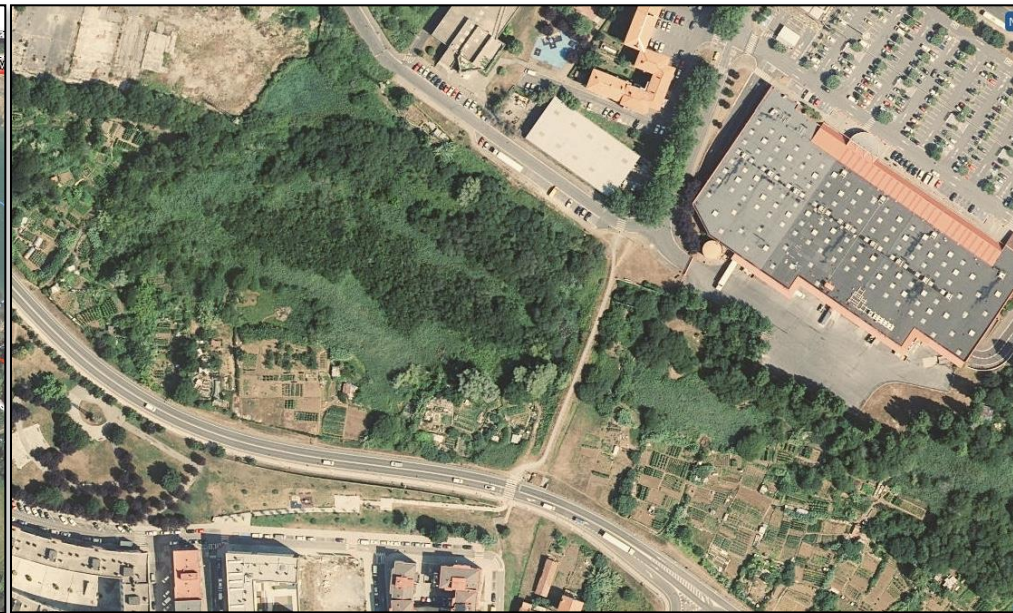
Si no hubiéramos invertido tanto en medio ambiente...

...¿viviríamos mejor o peor?

Esos problemas enquistados



Motondo



Udondo

Euskadi, el lugar del mundo con más especialistas en resolución de conflictos...

...¡utilicémoslos!



Lo inimaginable acaba siendo realidad



Nuestro mayor límite no es la falta de presupuesto...
... es la falta de imaginación/ambición

A photograph of a small, clear stream flowing through a dense forest. The water is slightly blurred, suggesting a long exposure. The stream is surrounded by moss-covered rocks and fallen logs. The forest floor is covered in ferns and other green plants. The overall scene is vibrant and natural.

¡Atrevámonos!

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