# The Potomac of the Future will be different than the Potomac of the Past

Peter Tango
USGS@CBPO
October 17, 2024
Reeling in Invasive Species

# A few notes about me:
# Growing up with Dad – the outdoorsman

# My early days – the community knew me

The Democrat's Sportsweek

ROD AND RIFLE

Hank Panchyshyn

## Fishing Results

Well with the week starting out so poorly I was beginning to wonder if I would have any decent reports to make this week, but thank God for Friday, Saturday and Sunday. It appears as if the bass were just waiting for the weekend to start before beginning to feed.

Fred Mangabang of Monticello took a 2 lb. 15 oz. bass from Davies Lake, and Perry Meltzer, a Monticello attorney, took a dandy 6 lb. 1½ oz. bass from Lake Louise Marie. It measured 20½" long and had a 16½" girth. Billy Stanton of Rock Hill took a whopping 6 lb. 4 oz. bass that measured 21" long and had a girth of 16¾". Congratulations, Bill!!! Ron Stanton of Rock Hill took four largemouth that all weighed in over 2 lb., the largest of which was pickerel in the two pound class while fishing at Yankee Lake. So, as you can see, the fish are starting to feed; bass fever is running rampant; and I recommend that you take the time and do a little fishing.

Now for which lure most of the successful fishermen have been using — it has been the rubber worm, although many have been caught on spinner baits and live bait. Also the jig and pig has accounted for Perry Meltzer's two lunkers, and he keeps insisting that it is going to produce him a much bigger fish yet!! So, the way I see it at this point, if you put the time in fishing, just about any of these lures will give you pleasant results at the end of the day.

As far as the color, it appears that

**Dynamic Duo**

Pete Tango, right, and Russ Dobransky had a good day of fishing too. The boys caught three largemouth bass [illegible] more than 3½ pounds, plus two pickerel.

The Democrat's Sportsweek

July 1982

ROD AND RIFLE

Hank Panchyshyn

## Summer Success

Well summer has finally made it. We have gone from cold, windy, rainy weather to extreme heat and high humidity. Now which one is the best for fishing is anyone's guess. Every week we have a few nice catches that lead you to believe that something is starting to break, but then it peters right out and fishing again becomes hard. It appears that most of the fish acquire some form of lockjaw or decide to go on a hunger strike and refuse to take almost anything. Of course you always have a few showoffs who seem to be able to catch fish under any conditions to make the rest of us feel like dummies.

You have guys like Ben Fader of Lake Louise Marie who brought in a 4 lb. pickerel that measured 23¾" long. And then there are other guys like Pete Tango who seems to be hogging most of my pictures in the Democrat lately with fish like this 5 lb. 5½ oz. largemouth accompanied by a 3¼ lb. lunkers, and just accept them if they come!!

Also I would like to mention that Claude Wilcox of Monticello brought in a 24 lb. 14 oz. carp, taken in Swinging Bridge. Eric Ivan, also of Monticello, caught a 16 lb. 1 oz. carp also out of Swinging Bridge.

Now to let you in on my success so far this year, I want you to note that I have left this for the last few lines only because that is all the room necessary to say that I probably would have had better luck had I stayed at the store and fished in my bait tanks. My biggest bass so far this year was 5 lb. 4 oz. minus a few inches which a large snapping turtle decided he needed worse that I did. So a word of advice, if you catch a fish you decide to keep and put him on a stringer, beware of hungry mouths that lie in waiting.


Photo by Hank Panchyshyn

**Two Lunkers**

Pete Tango is one of the success stories of summer fishing. Pete caught two lunkers from Yankee Lake recently. One tipped the scales at 5 pounds, 5½ ounces, and the other weighed 3 pounds, [illegible] ounces.

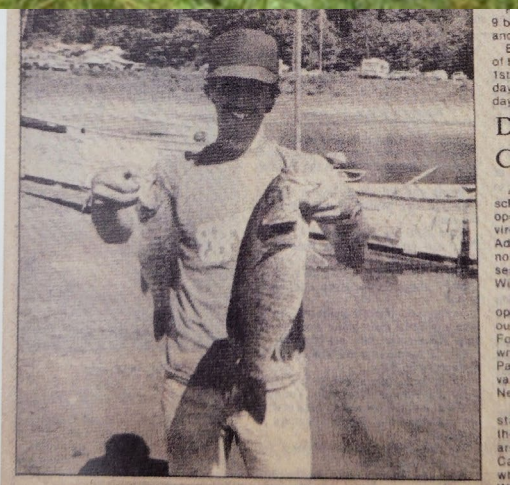
Jack and Kay Danchak

SPORTSMAN OUTDOORS

*Tango Wins Swinging Bridge*

Peter Tango Jr. of Wurtsboro won [illegible] Don Kobiela of Cochecton RD came

*Loved bass fishing*



Pete Tango Jr. won the Swinging Bridge Tournament of the First Bassmasters Club held recently. Tango caught two bass weighing a

*1983 - A second bass tournament win. Sullivan Co*

Sports/Week

The Democrat

Jack and Kay Danchak

SPORTSMAN OUTDOORS

## The Fishing Is Good for Some Folks

fishing on the Beaver Brook Hunting Club's private lake, caught four nice bass, the largest weighing in at 4 lb. 2 oz. Frank was using a Mann's motor-oil augertail 6 in. worm.

Members of the Stiff-neck Hunting Club in Callicoon went shark fishing off Long Beach, N.Y. Johnny Miller Jr. caught two blue-shark that weighed 175 lbs. each. John Miller Sr. caught three shark, the largest weighing 250 lbs. 8-year-old Chris McShane caught a 70 lb. Maco on 20 lb. test line. The fishermen were using mackerel as bait and chum.

July 1983

**Tango Wins Chadwick 1st Bassmasters Tournament**

19-year-old Peter Tango Jr. of Wurtsboro, one of the younger members of the 1st Bassmasters Fishing Club to Sullivan County, won the club tournament held recently at Chadwick Lake in Newburgh.

three fish on the jig and pig black on black. Mike's catch h ed him from 6th to 2nd place in stand gs.

Dan Schoonmaker of Mid came in 4th with two fish f weight of 6 lb. 11 oz. Dan ca fish ona white spinnerbait. Da placed him 4th in the club st

Jack Danchak came in 5th p three fish for total weight of 6 Jack credits a spinnerbait and for his catch. Jack remains in inthe club's standings by a 5 lb

Ken Bloom came in sixth p three fish for total weight of Ken credits the Sassy shad for Ken also moved from 18th to in the club standings.

The club caught a total of 66 lb. 11 oz. Everyone seeme themselves and we can say t wick Lake still harbors some fish.

# A lifetime of loving to chase rainbow trout!


And always in search of “The precious”
(aka Brown trout)

My family has enjoyed the harvest of fish and game to put food on the table


ASSIFIED
CLASSIFIED
CLASSIFI


# The precious! (aka Brown trout)

Lowe S., Browne M., Boudjelas S., De Poorter M. (2000)

100 of the World's Worst Invasive Alien Species:

A selection from the Global Invasive Species Database

# Rainbow Trout

Lowe S., Browne M., Boudjelas S., De Poorter M. (2000)
100 of the World's Worst Invasive Alien Species:
A selection from the Global Invasive Species Database.

IPBES. Top 10 most widespread invasive alien fish species worldwide

# Wild Hog

*Peter's smoked, pulled wild boar*



Seebens et al. 2023. IPBES
Top 10 most widespread invasive alien mammal species worldwide.

Lowe S., Browne M., Boudjelas S., De Poorter M. (2000)
100 of the World's Worst Invasive Alien Species:
A selection from the Global Invasive Species Database.

# Ring-necked Pheasant

Seebens et al. 2023. IPBES
Top 10 most widespread invasive alien bird species worldwide.

Conclusion: Peter is an invasivore!

How did this come to be?

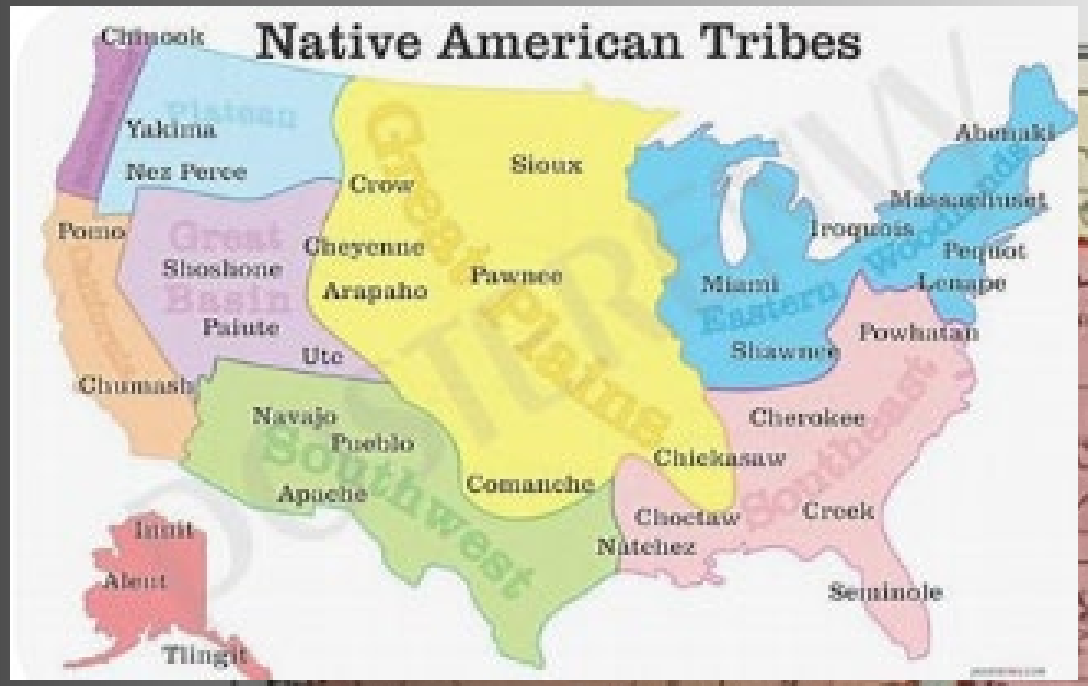
Taking a step back in time...

- In 1609 Captain John Smith wrote “we had more sturgeon than could be devoured by dog and man.”

  However,
  - The following years saw more supply ships arriving from England, bringing **pigs, goats, and cattle**.

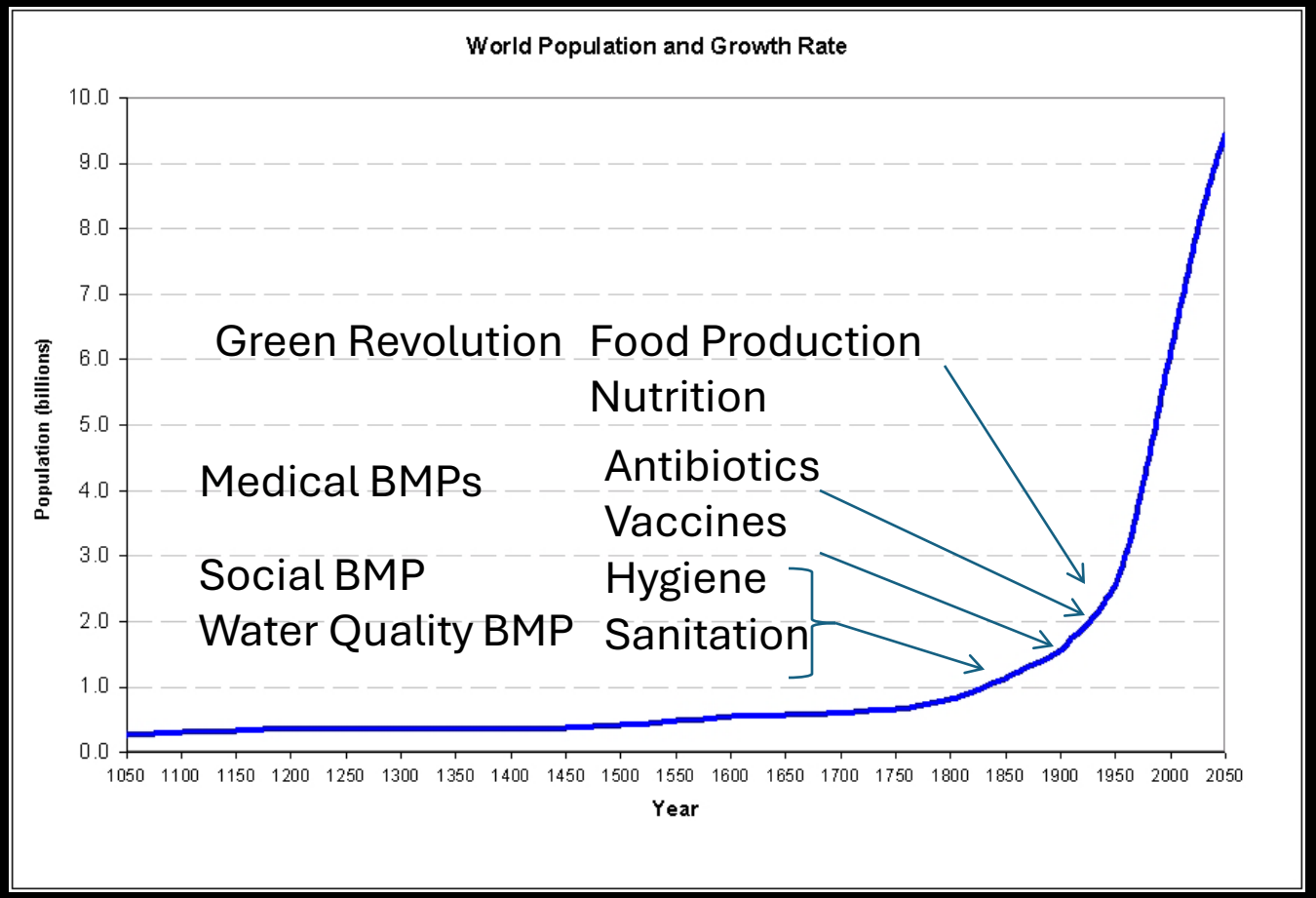
  - **Colonists transplanted fruit trees** which Captain John Smith noted “prosper(ed) exceedingly.” Fruit like **apples and figs** could be distilled into hard cider and other alcoholic beverages, which was often safer to drink than the local water supply.

Everyday Life in the Jamestown Colony | American Battlefield Trust (battlefields.org)




# U.S.A: We were a growing, expanding, colonizing nation coincident with the industrial revolution

# *Population growth: Humans didn't suddenly learn to multiply like bunnies, we stopped dying like flies!*




Industrial Revolution – major turning point in human history raising living standards for the masses.


**1600s-1800s in the U.S.**

Market hunting, eco-imperialism, lack of regulations, lack of enforcement of regulations, habitat alteration = overexploitation

# Societal response to resource scarcity –

## Substitution

- The common carp was introduced into the United States in the 1800s as a food and game fish[1].

- The U.S. Commission of Fish and Fisheries began an intensive effort of carp cultivation in 1877 due to public pressure and the worrisome decline of native fish stocks after a century of intense exploitation[23].

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By 1885, the U.S. Fish Commission was actively stocking lakes and rivers throughout the country with common carp, and it is now prevalent throughout the entire United States[1].

# The idea of sport fishing:
Cultural biases of substitution still influence management focus today

- **From art to religion to land use, much of what is deemed valuable in the United States was shaped centuries ago by the white male perspective**
- **European colonists heavily influenced what fishes were more valuable, often the species that looked more similar to what they're used to.**
- **So trout, bass and salmon got their value while many other native species got pushed to the wayside.**

Cultural biases impact native fish, too | ScienceDaily

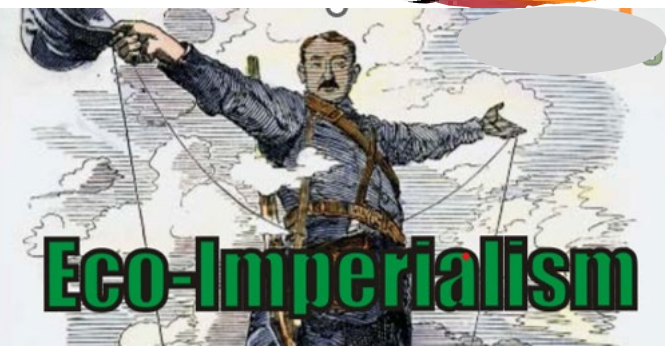
Rypel et al. 2021. Fisheries

# However, also 1800s paradigm evolved – *Native fish are the enemy of game fish*

- **1800s Management Paradigm – native fish limit game fish species historically desired by Europeans. White, male Europeans.**
- **Native species are devalued, termed 'rough fish'**
  - **E.g., Alligator gar – "a wolf among fish" – poisoned, dynamited, and electrocuted to greatly reduce its population.**
  - Many native fish valued by indigenous people and people of color, devalued by colonists, were species of cultural and spiritual significance.

# Ecological imperialism – a soft power play in politics

- **Modern American society still strongly reflects the 400 years momentum of** the contribution of European (and other) biological species introductions such as animals, plants and pathogens supporting the success of the early European colonists




Conclusion: Peter is an Eco-imperialistic invasivore!

# Foreign example: Management motivations with Nile Perch introduction into, Lake Victoria, Africa

- **In 1954, British colonial authorities under the Uganda Game and Fisheries Department introduced the Nile Perch into Lake Victoria intending to:**

- **reduce the overfishing of tilapia**
- **develop the fishery's profitability**
- **release a fish similar to a prehistoric one that once lived in Lake Victoria, and**
- **to introduce a fish to prey on haplochromines**

Nile Perch
Top 100 most invasive species in the world

Lake Victoria cichlids
80% to 1% of lake biomass

# Management motivations with Nile Perch introduction into, Lake Victoria, Africa

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- **to introduce a fish to prey on haplochromines (cichlids, estimated 80% of Lake Victoria biomass before Nile Perch introduction. One of the most species rich concentrations of freshwater fish in the world.)**

# Lake Victoria and Nile Perch

## Winners

Political ecology - Eco-Imperialism

- Capitalism – benefitting Europe
  - Europeans find Nile Perch a good replacement for limited cod stocks
  - EU is importing Nile Perch


Africa's largest freshwater lake
Lake Victoria

## Losers

**Local cultural loss of indigenous traditional life style** – haplochromine biomass down to 1% of historical(~80%) measures

**Local terrestrial impact on regional woody habitat** – soil erosion and desertification intensified

Estimate that **~40%** of the >300 Lake Victoria haplochromines **went extinct**.

Degraded water quality, novel ecology


Where are we now anyway?

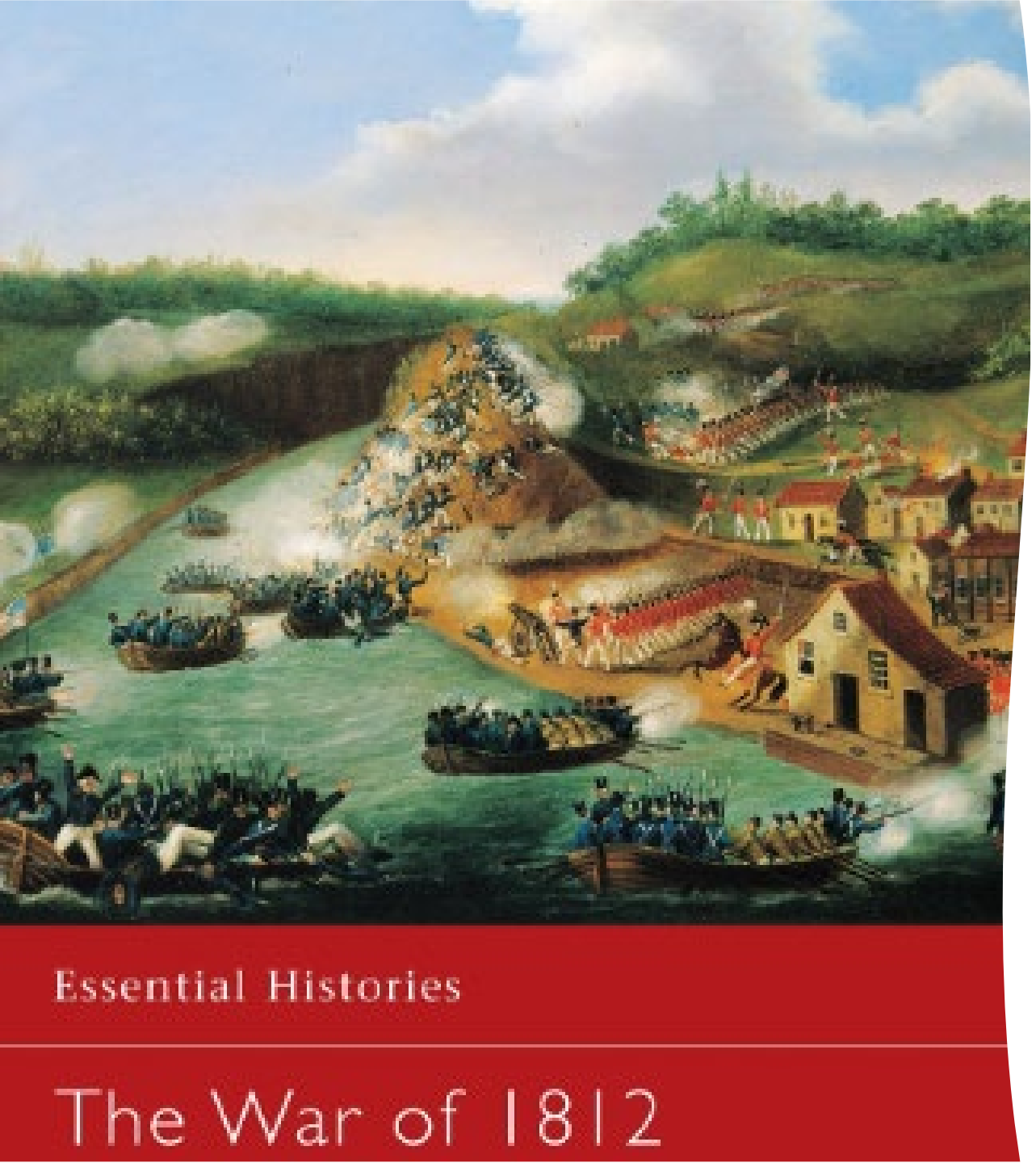
**200**

The number of invasive species that may live in the Chesapeake Bay watershed

## Partnership goals

The Chesapeake Bay Program is committed to reducing the number of invasive blue catfish in the Chesapeake Bay through its Invasive Catfish Workgroup. The workgroup is responsible for coordinating the best available science and developing methods to evaluate the impacts of invasive catfish species on the Chesapeake Bay ecosystem.

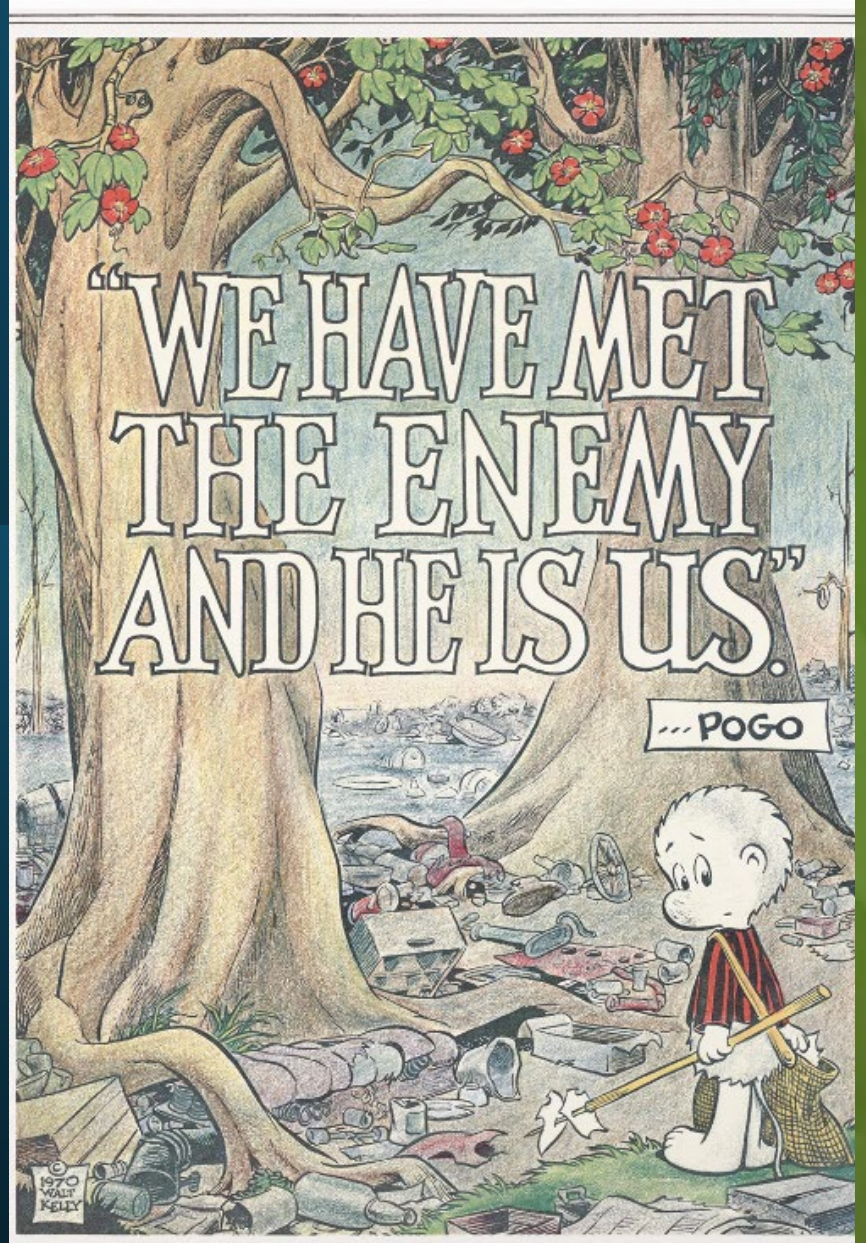
Track our work at ChesapeakeProgress.com ›




- During the War of 1812, the United States Navy defeated the British Navy in the Battle of Lake Erie.

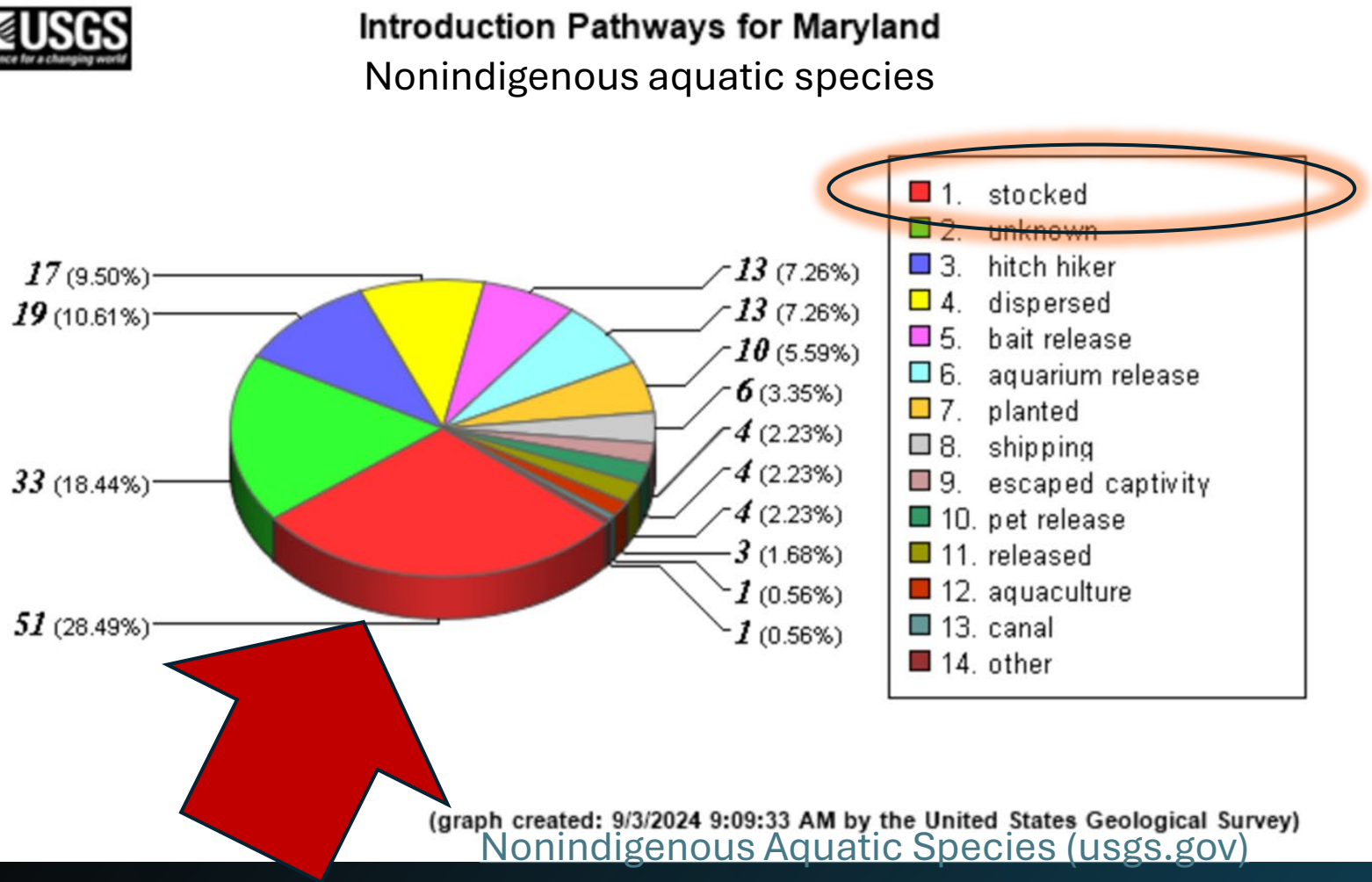
- Master Commandant Oliver Perry wrote to Major General William Henry Harrison, “**We have met the enemy and they are ours**.”

1970 – An appropos parody of the 1812 statement that can apply to our management today

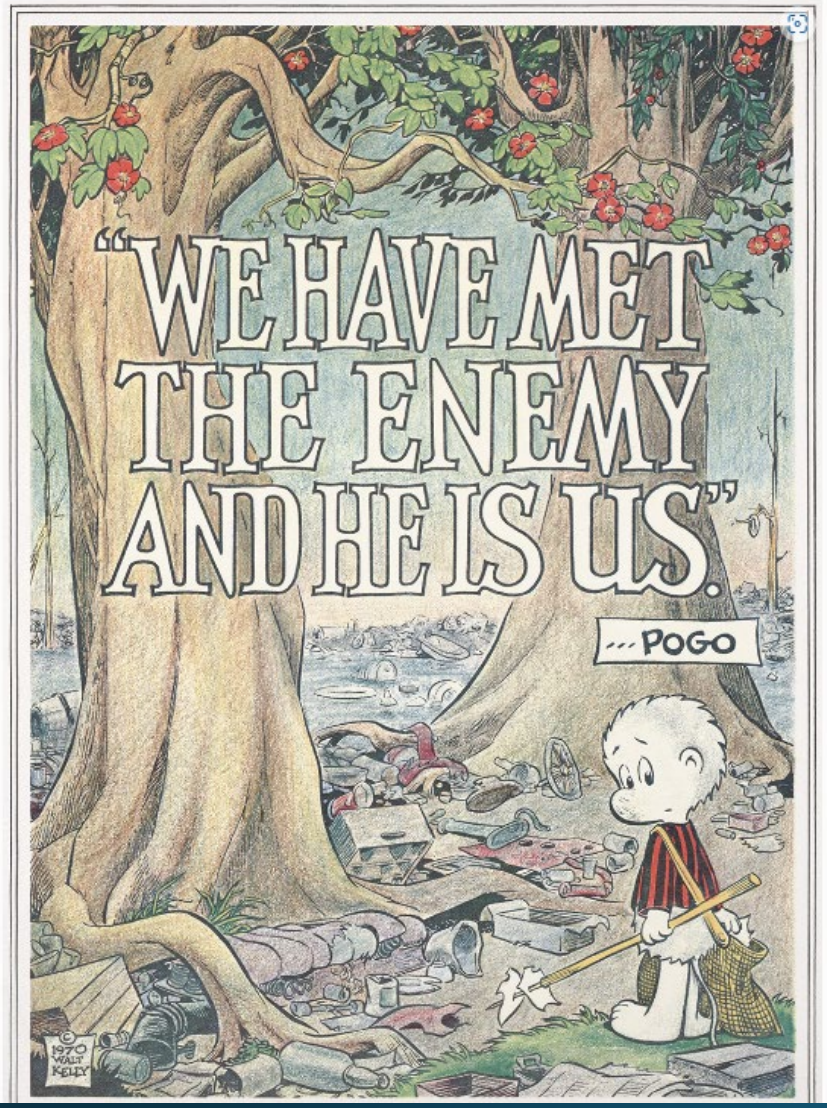



lt Kelly
e Have Met the Enemy..."
80 reprint of 1970 poster
ni Mendez Collection

Each category represents a combination of a species introduced via a pathway. A single species can be introduced by more than one pathway and may therefore be counted more than once.




Nonindigenous Aquatic Species (usgs.gov)




Stocking is the # 1 introduction pathway for nonindigenous aquatic species arrivals in MD, VA, WV, PA, and #2 in DC (only behind "unknown". )


Each category represents a combination
introduced by more than one pathway an
17 (9.50%)
19 (10.61%)
(graph
Eco-Imperialism

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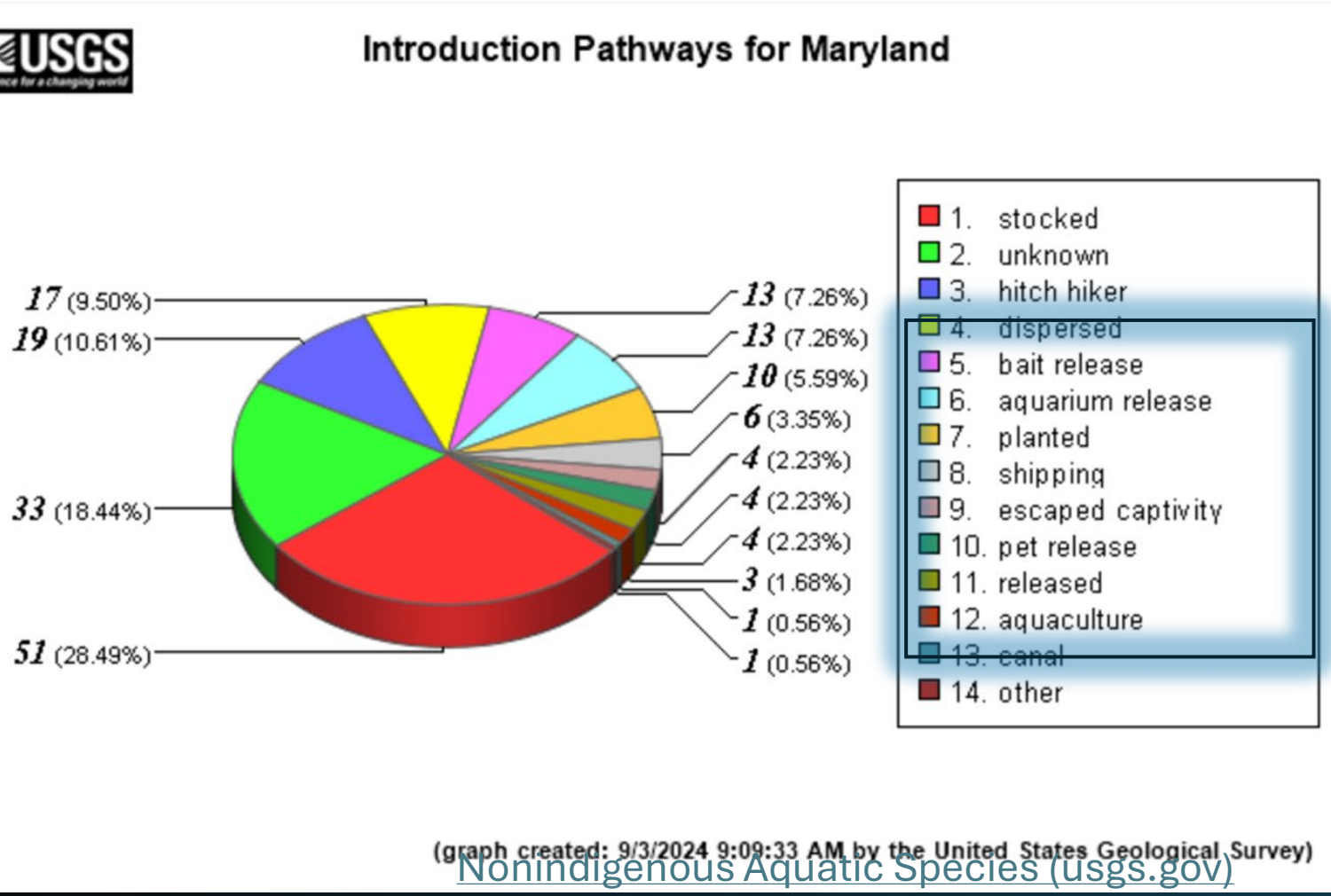


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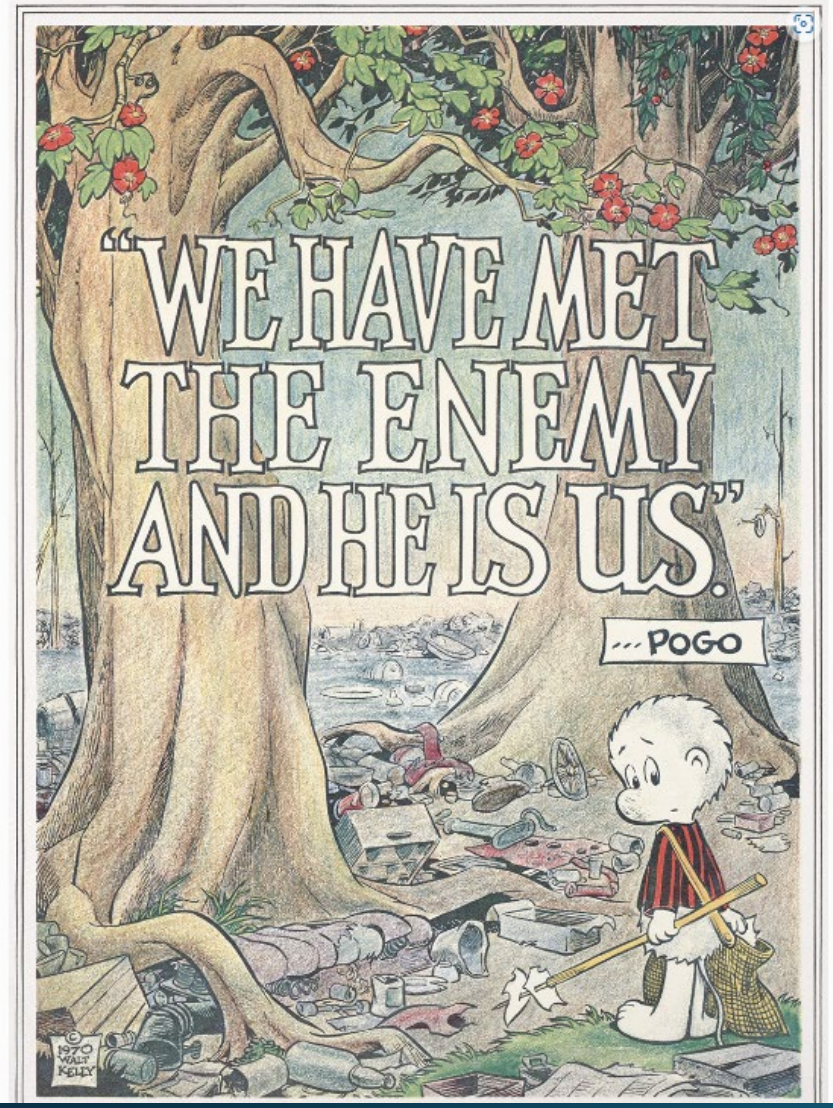
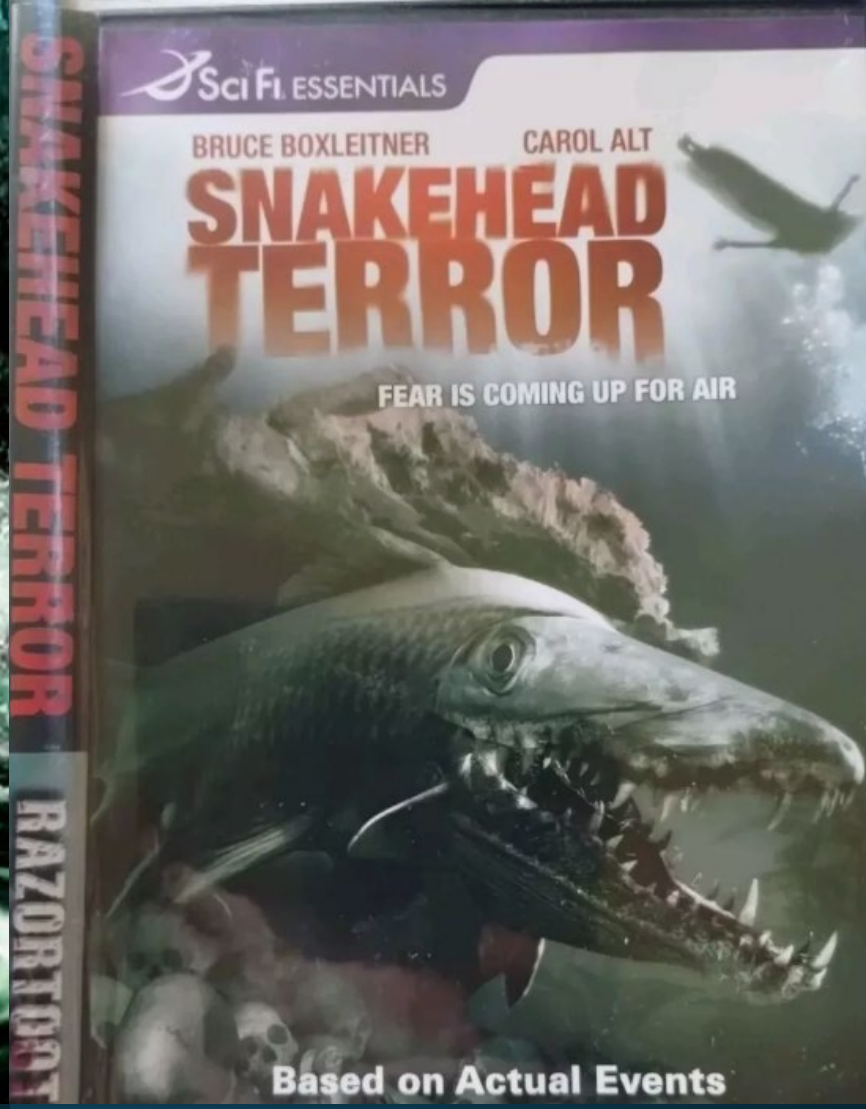



Beyond stocking – can we work at the individual level on behavior change in society?


Can we run effective public awareness campaigns for the management of invasive species?





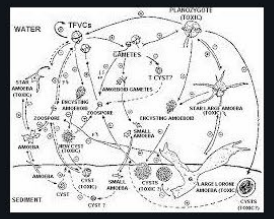

Who can forget these classics!
The "*Jaws*" of Chesapeake Bay!

# Sensationalism – awareness, benefits to conservation?

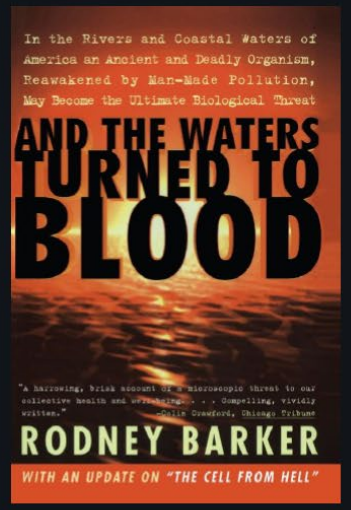
- Sensationalism is a common tactic used by media outlets to capture audience attention through exaggerated language, fear-mongering, and sometimes even misleading information

## The height of hysteria! (1997-2002)


Daily news headlines

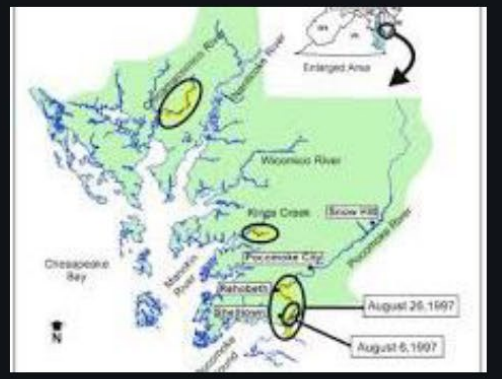


Science literature and debates




Popular literature

Compelling (bloody) fish photos




Weekly web updates and maps

*Environmental Conservation*

cambridge.org/enc

# On the effectiveness of public awareness campaigns for the management of invasive species

2023

Anne L Haley[1], Tanya A Lemieux[1], Morgan L Piczak[1], Spencer Karau[2], Alexa D'Addario[2], Robyn L Irvine[3], Christine Beaudoin[4], Joseph R Bennett[1] and Steven J Cooke[1]

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**Subject Review**

**Cite this article:** Haley AL et al. (2023) On the effectiveness of public awareness campaigns for the management of invasive species. *Environmental Conservation* **50**: 202–211. doi: 10.1017/S037689292300019X

Received: 15 March 2023
Revised: 19 July 2023
Accepted: 21 July 2023
First published online: 22 August 2023

**Keywords:**
Biological invasions; exotic species; non-native species; outreach; public engagement; science communication

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**Summary**

Invasive species can have disastrous effects on the ecosystems they invade, requiring costly, labour-intensive mitigation. Public awareness campaigns are often used as a tool to reduce these species' impacts. While heralded as useful and cost-effective, little evidence suggests that these campaigns contribute to meaningful biological outcomes. Furthermore, awareness campaigns are relatively understudied despite their usage as a common approach to mitigating invasive species. We conducted a literature review to assess publications that evaluated the efficacy of public awareness campaigns for managing invasive species. Out of 4382 papers initially extracted for analysis, we determined that 24 of them included studies conducted on awareness campaigns for invasive species. Four public awareness campaigns were deemed a 'success', and the other campaigns' success was indeterminable due to study design. Our study revealed that inconsistencies in defined end points, unclear procedures and variability of campaigns contribute to there being insufficient evidence to determine the efficacy of public awareness campaigns. To evaluate the true efficacy of public awareness campaigns, we recommend that organizations conducting such campaigns implement rigorous and standardized assessments (e.g., Before–After Control–Impact designs or Bayesian analyses) that include measures of not just changes in the knowledge and behaviour of target audiences, but also relevant biological outcomes.

- "Our study revealed that inconsistencies in defined end points, unclear procedures and variability of campaigns contribute to there being insufficient evidence to determine the efficacy of public awareness campaigns."


Can we predict risky human behavior involving invasive species?


Can we predict risky human behavior involving invasive species?

A little it seems...

# Socioeconomics of release probability

Red-eared slider

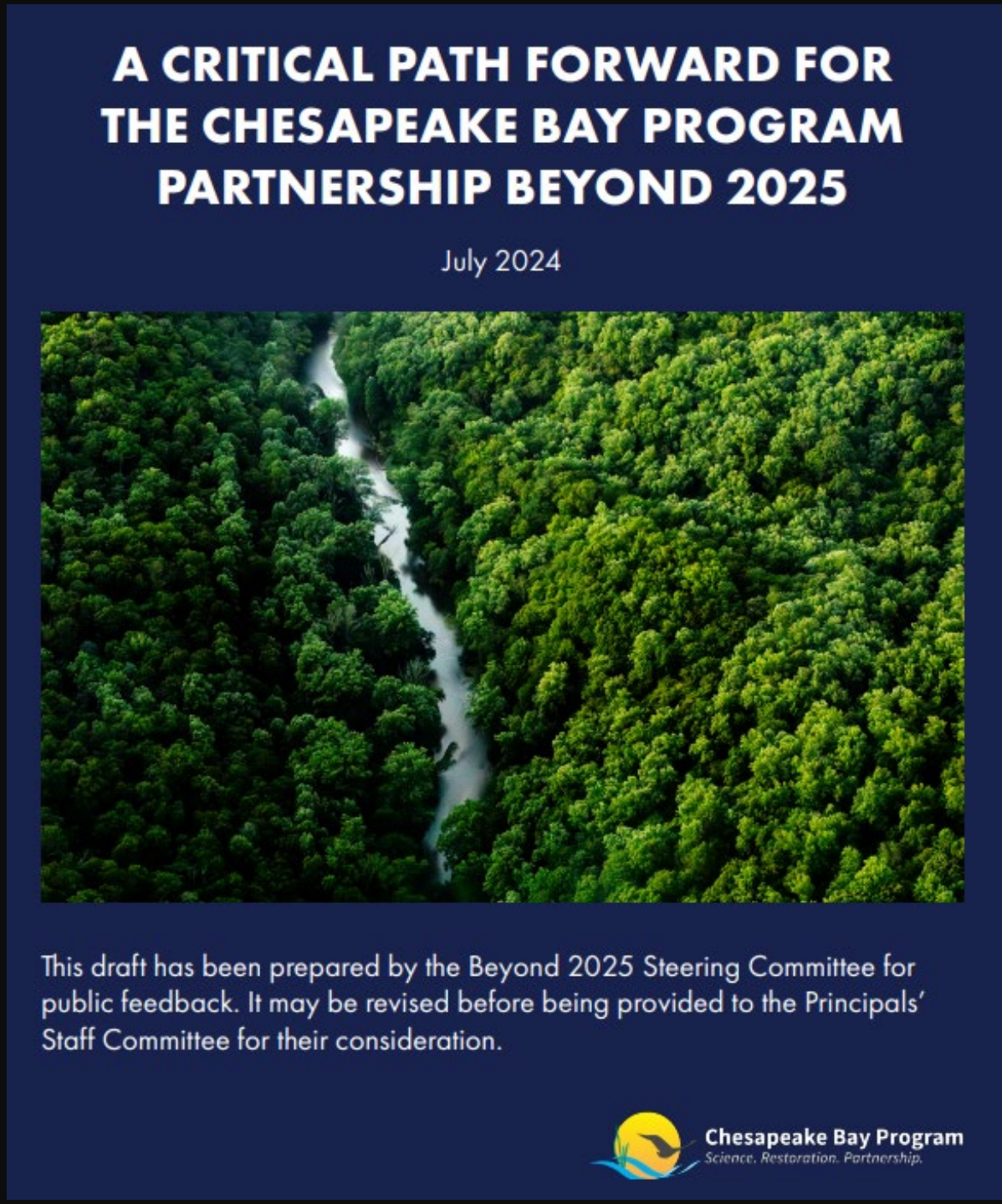
- **Economic factors** influencing release probability –
  - **Market Abundance** – less-rare animals are more likely to be released.
  - **Market Price** – exotic animals traded at lower prices are at a higher risk for release.
  - **Time On Market** – the longer animals are being traded, the more releases occur.
    - Stringham and Lockwood, 2018. J Applied Ecol.

- **Although larger-bodied reptiles and amphibians are more likely to be released, other research suggests that smaller species are more likely to establish self-sustaining populations.**
  - However, despite import quantity strongly increasing release probability, this does not translate directly into higher probability of successful establishment.
    - Jasiunus, 2019. https://faunalytics.org Why people release their exotic companions

# Chesapeake Bay – Beyond 2025

- "The (Beyond 2025) Steering Committee also **recommends a greater focus on conducting social science research and applying its findings to ensure restoration and conservation efforts align with the well-being of people.**

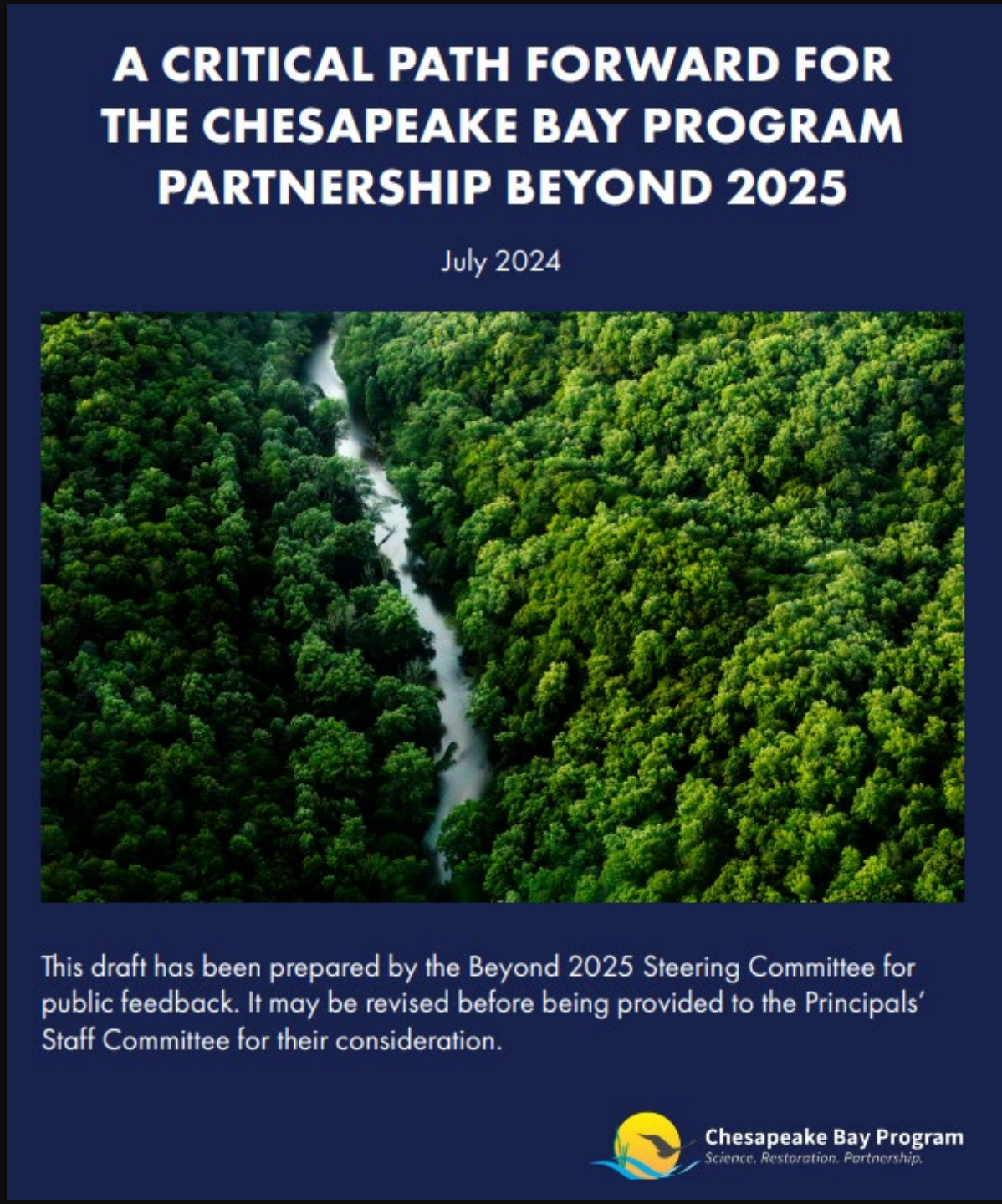
- **Social science** should be applied where it can have the greatest overall impact and applied strategically rather than opportunistically.



# Chesapeake Bay – Beyond 2025

## Prioritizing the understanding of people's values and motivations:

- Help drive sustainable natural resource use, management, and decision-making
- Ensure equitable inclusion of all communities in restoration and conservation efforts

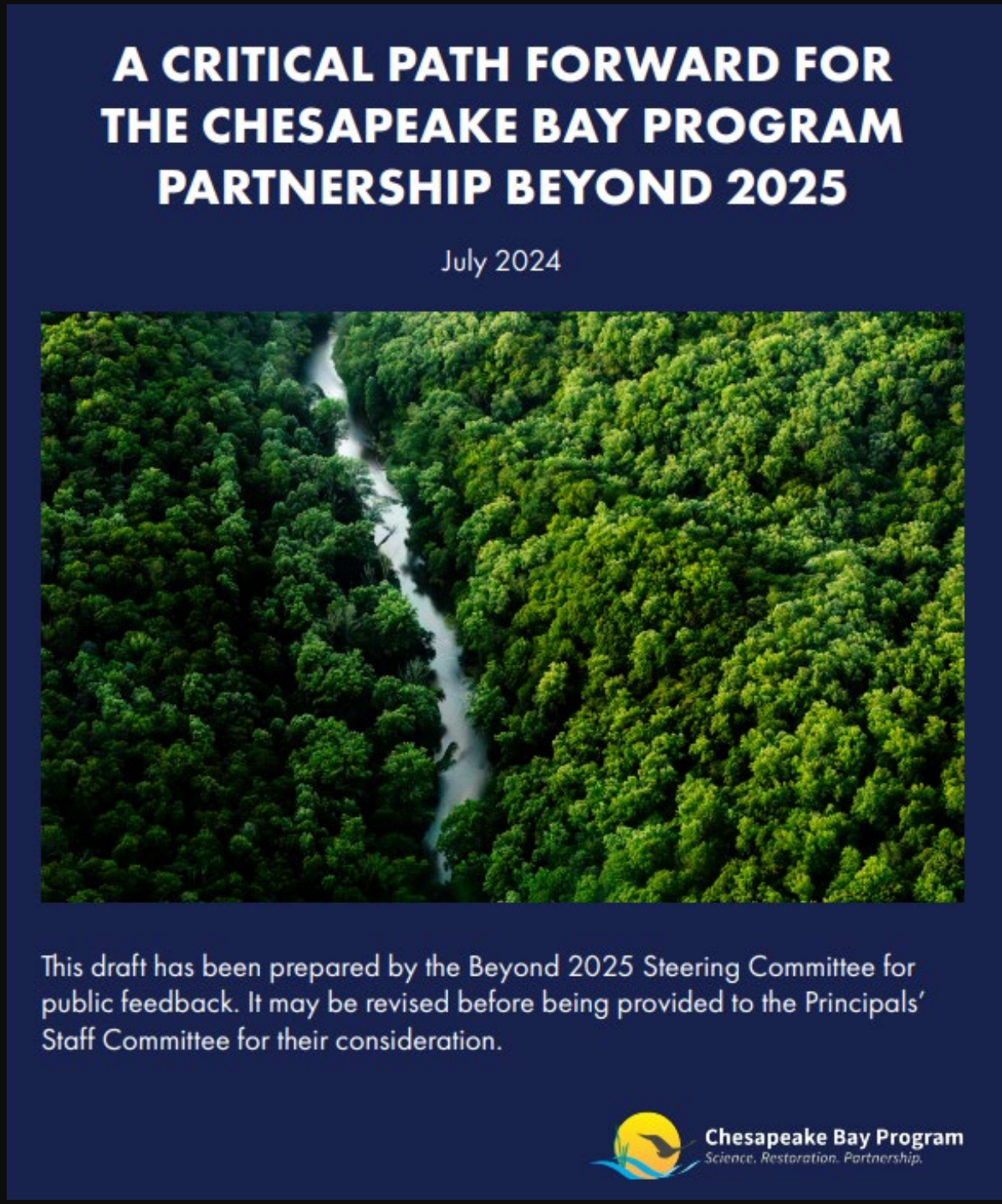


# Chesapeake Bay – Beyond 2025

## Prioritizing the understanding of people's values and motivations:

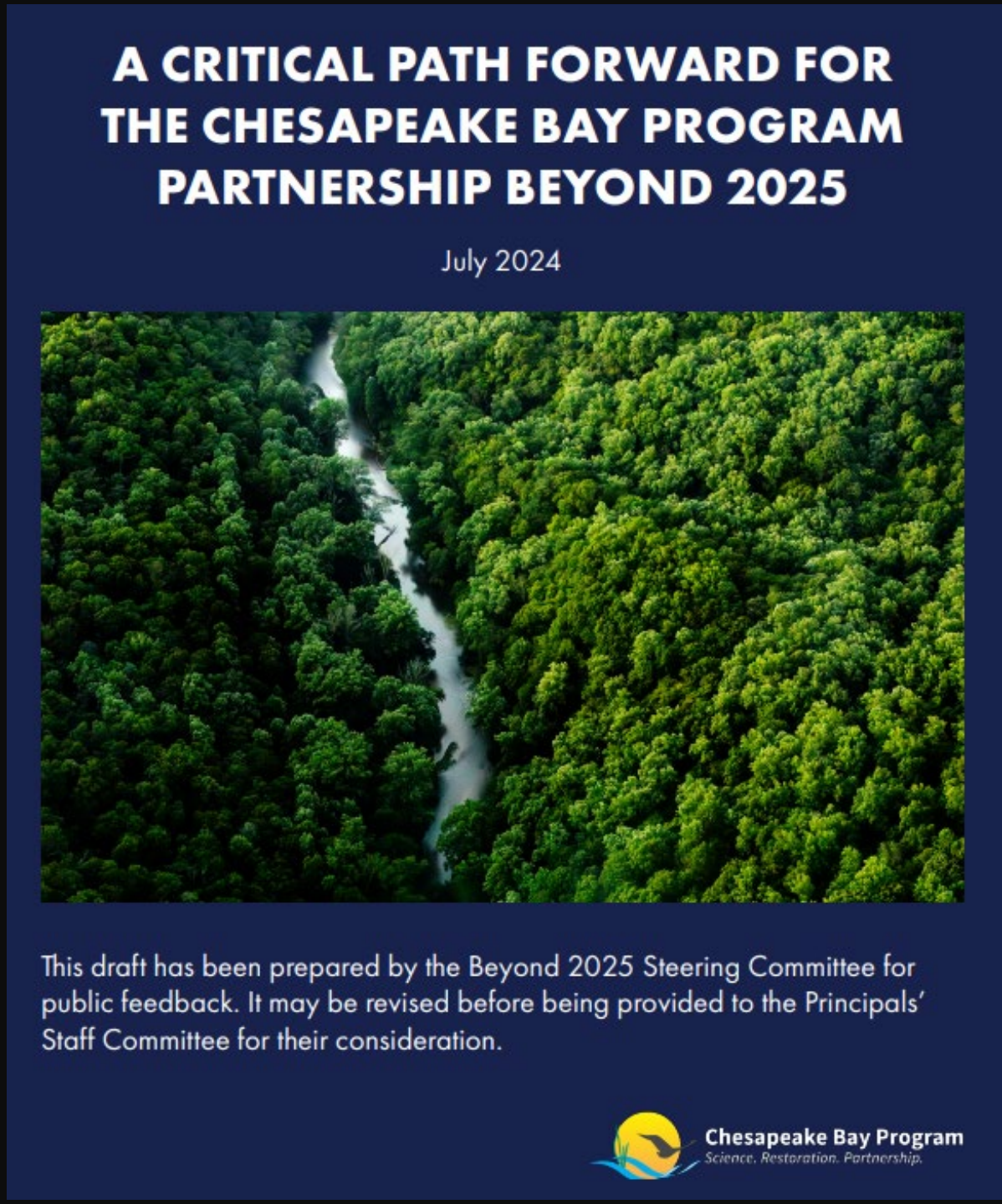
- Help drive sustainable natural resource use, management, and decision-making
- Ensure equitable inclusion of all communities in restoration and conservation efforts

A plug here for increased investment towards diverse engagement and social science research



# Chesapeake Bay – Beyond 2025

- Prioritizing the understanding of people's values and motivations can help drive sustainable natural resource use, management, and decision-making as well as ensure equitable inclusion of all communities in restoration and conservation efforts



Where are we going?

# Consider the past and the future

Jemez Pueblo

Corn – sustenance

Rain clouds – plentiful crops

Jemez Pueblo

Eagle feathers – strength, trust, bravery,  honor, connection between physical and spiritual worlds

Jemez Pueblo

Wind, whirlwind –
journey,
closing of one door and
opening of new doors,
adaptation to change

Jemez Pueblo

We are managing an emergent, novel ecology

POLICYFORUM

CLIMATE CHANGE

# Stationarity Is Dead: Whither Water Management?

Climate change undermines a basic assumption that historically has facilitated management of water supplies, demands, and risks.

P. C. D. Milly,[1]* Julio Betancourt,[2] Malin Falkenmark,[3] Robert M. Hirsch,[4] Zbigniew W. Kundzewicz,[5] Dennis P. Lettenmaier,[6] Ronald J. Stouffer[7]

Systems for management of water throughout the developed world have been designed and operated under the assumption of stationarity. Stationarity—the idea that natural systems fluctuate within an unchanging envelope of variability—is a foundational concept that permeates training and practice in water-resource engineering. It implies that any variable (e.g., annual streamflow or annual flood peak) has a time-invariant (or 1-year–periodic) probability density function (pdf), whose properties can be estimated from the instrument record. Under stationarity, pdf estimation errors are acknowledged, but have been assumed to be reducible by additional observations, more efficient estimators, or regional or paleohydrologic data. The pdfs, in turn, are used to evaluate and manage risks to water supplies, waterworks, and floodplains; annual global investment in water infrastructure exceeds U.S.$500 billion (*1*).

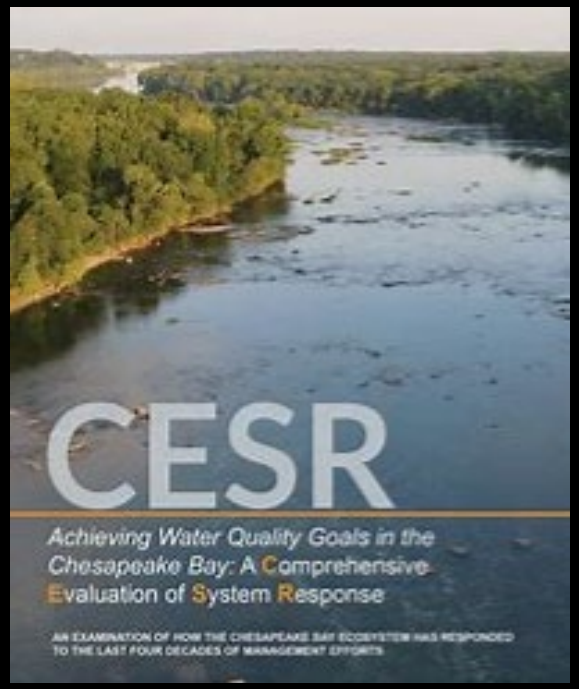
An uncertain future challenges water planners.

In view of the magnitude and ubiquity of the hydroclimatic change apparently now that has emerged from climate models (see figure, p. 574).

*Why now?* That anthropogenic climate change affects the water cycle (*9*) and water supply (*10*) is not a new finding. Nevertheless, sensible objections to discarding stationarity have been raised. For a time, hydroclimate had not demonstrably exited the envelope of natural variability and/or the effective range of optimally operated infrastructure (*11*, *12*). Accounting for the substantial uncertainties of climatic parameters estimated from short records (*13*) effectively hedged against small climate changes. Additionally, climate projections were not considered credible (*12*, *14*).

Recent developments have led us to the opinion that the time has come to move beyond the wait-and-see approach. Projections of runoff changes are bolstered by the recently demonstrated retrodictive skill of climate models. The global pattern of observed annual streamflow trends is unlikely to have

# STAC-CESR Report

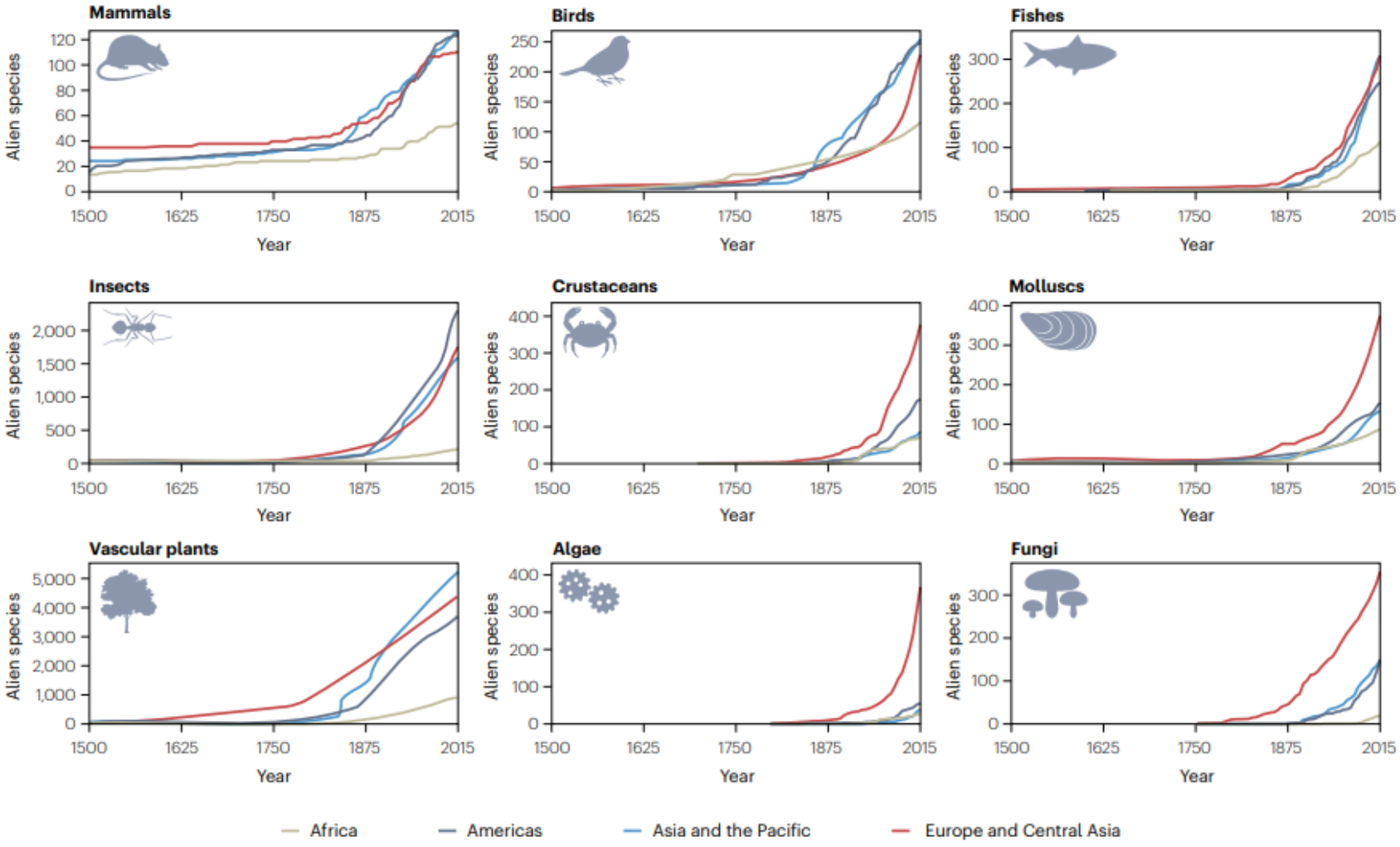



- “Meanwhile, the Bay and its watershed are changing in ways that make the future difficult to predict because historical precedent cannot guide us.”

- In other words: The Bay of the past is not the Bay of the future

Globally, regionally - trajectories of alien species (Y-axis) across time (X-axis) additions across all taxonomic groups are rising.

Rates of change also rising

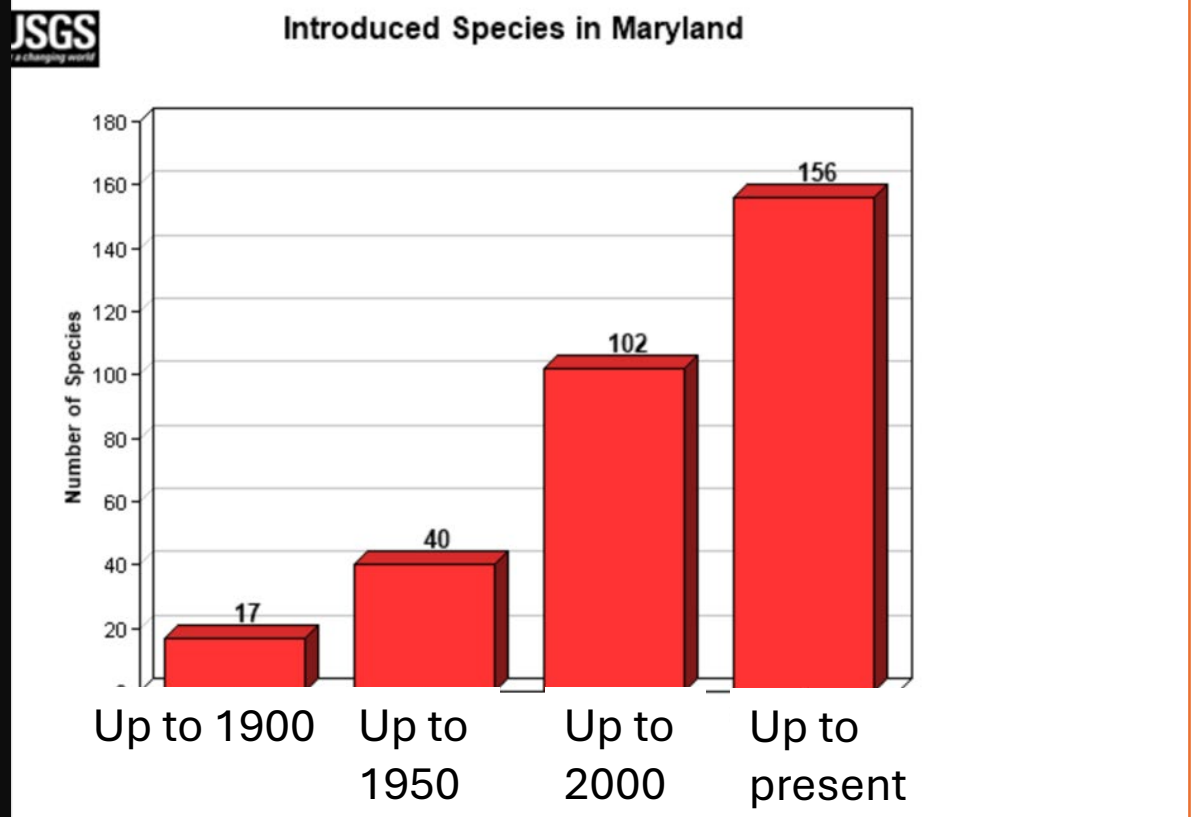



Roy et al. 2024. Nature ecology and evolution

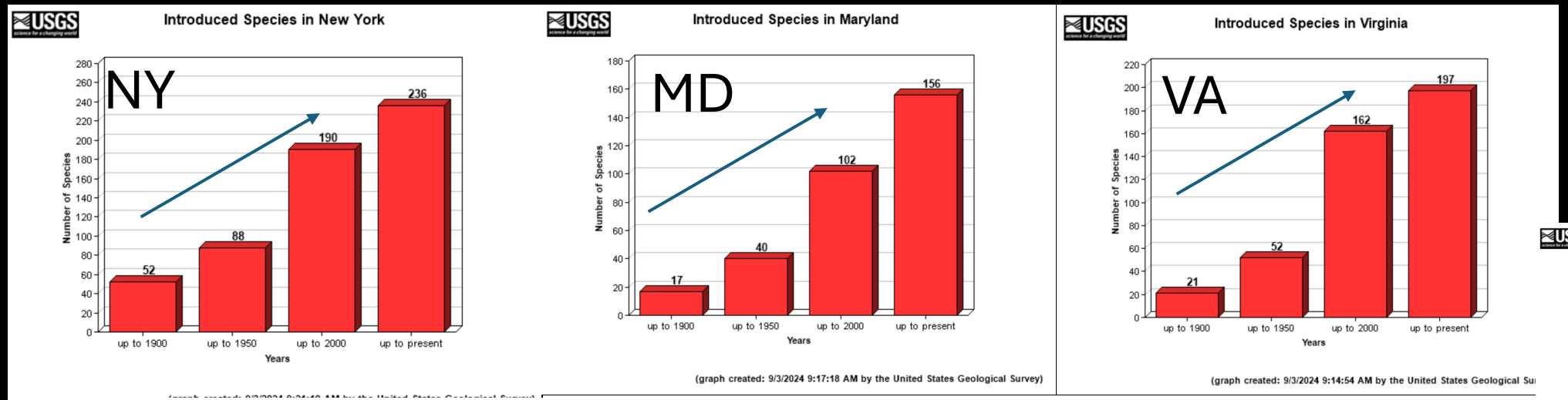
# USGS data – nonindigenous aquatic species of MD are increasing

https://nas.er.usgs.gov/graphs/State.aspx

graph shows the cumulative number of species that have been introduced up until the last year



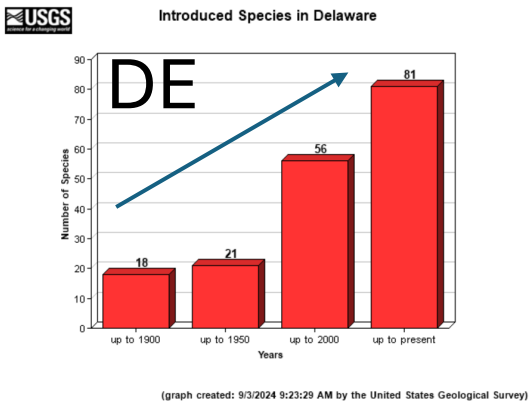
# The future: The rise of the nonnatives.
# A system of novel, emergent ecology continues

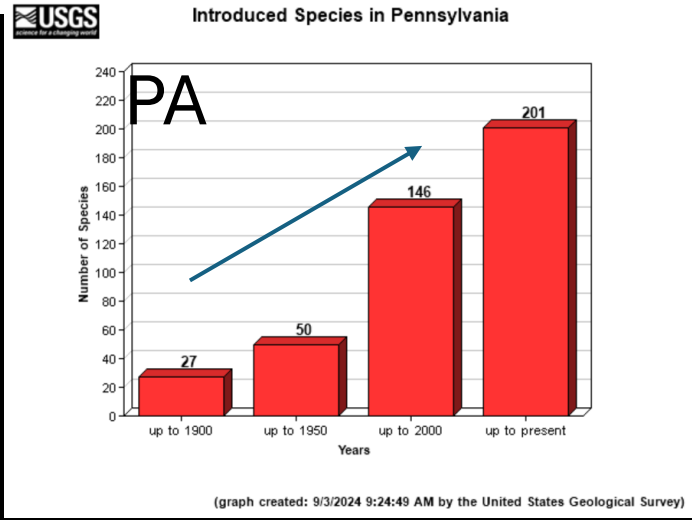


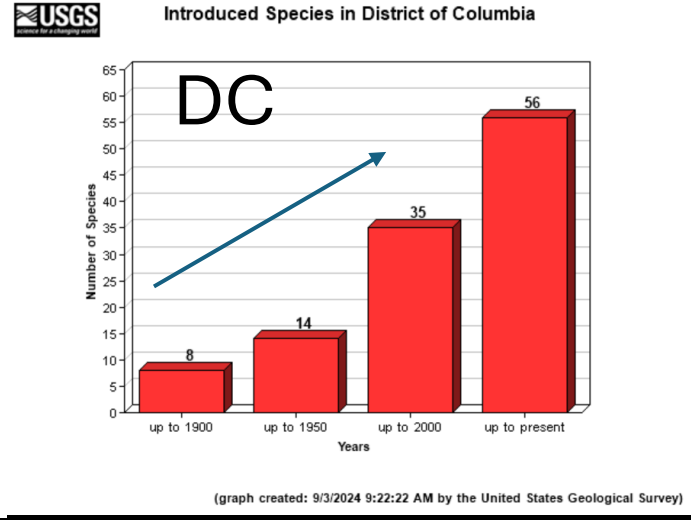


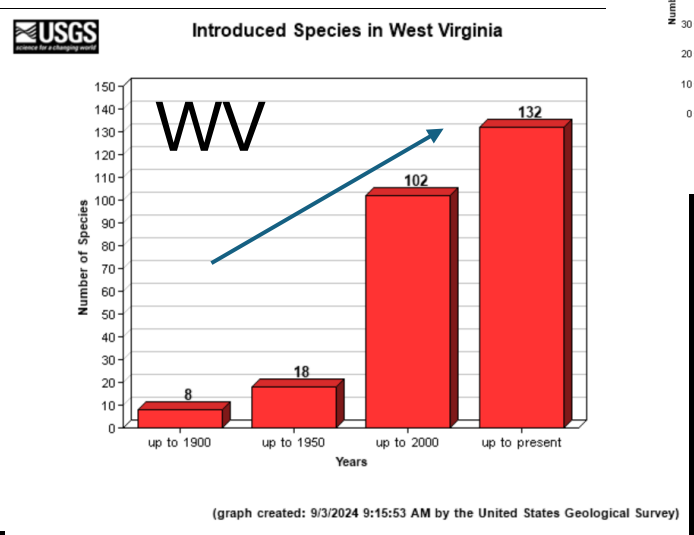


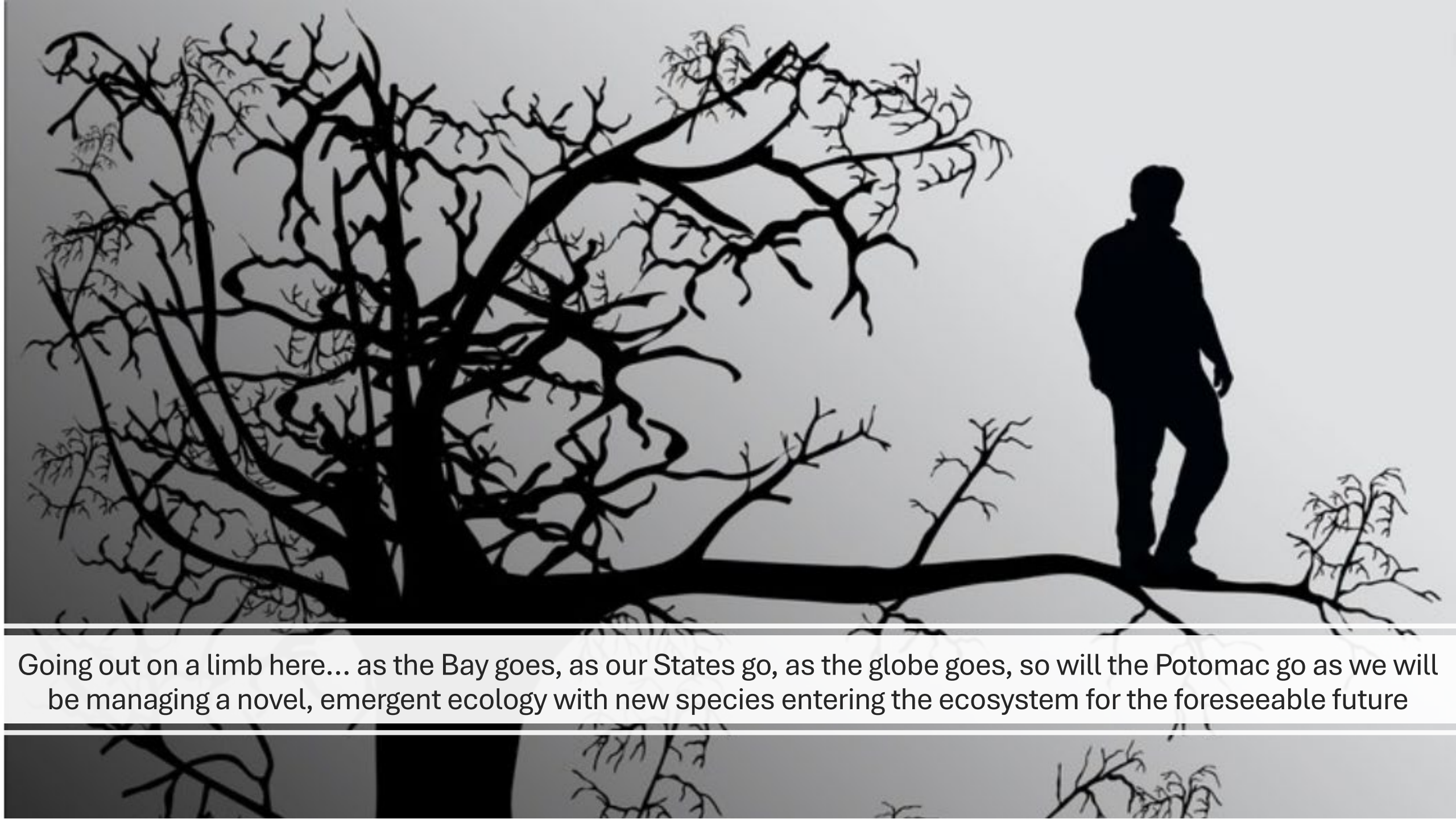


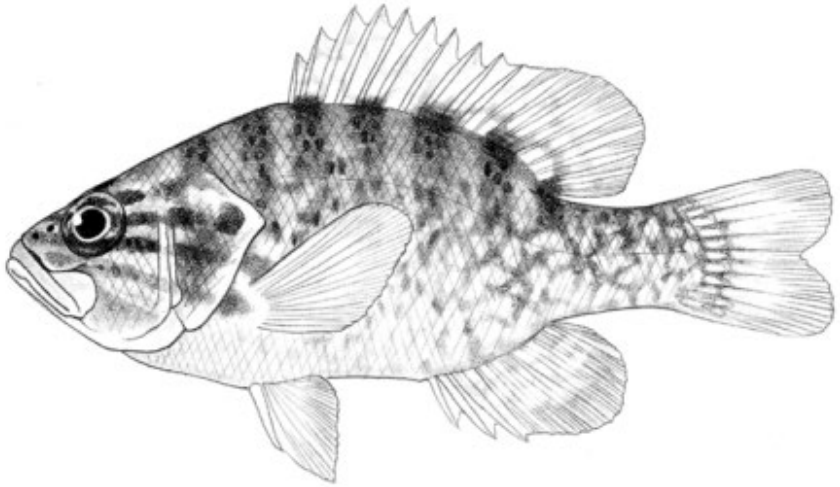


Going out on a limb here… as the Bay goes, as our States go, as the globe goes, so will the Potomac go as we will be managing a novel, emergent ecology with new species entering the ecosystem for the foreseeable future

# Not really going out on a limb – the continued story of change is in the data

- "Non-native and invasive fish have become more abundant across streams, with ten species—including flathead catfish and Chesapeake Channa, or northern snakehead—collected during this round that hadn't been observed 14 or 20 years earlier."

Source: https://news.maryland.gov/dnr/2024/07/23/looking-at-marylands-stream-health-over-time-dnr-report-finds-mixed-results/



**Maryland Biological Stream Survey Round Four Results**
**Investigating Potential Changes Over Time in Stream Conditions**

May 2024

Department of Natural Resources
Resource Assessment Service

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

DNR 12-050724-1

# Living in the New Pangea

PROCEEDINGS OF THE ROYAL SOCIETY B

CrossMark click for updates

*Proc. R. Soc. B* (2012) **279**, 4772–4777
doi:10.1098/rspb.2012.1651
*Published online* 10 October 2012

## Pattern and process of biotic homogenization in the New Pangaea

**Benjamin Baiser[1,*], Julian D. Olden[2], Sydne Record[1], Julie L. Lockwood[3] and Michael L. McKinney[4]**

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[2]*School of Aquatic and Fishery Sciences, University of Washington, Seattle, WA 98195, USA*
[3]*Department of Ecology, Evolution, and Natural Resources, Rutgers University, 14 College Farm Road, New Brunswick, NJ 08901-8525, USA*
[4]*Department of Earth and Planetary Sciences, University of Tennessee, 1412 Circle Drive, Knoxville,*

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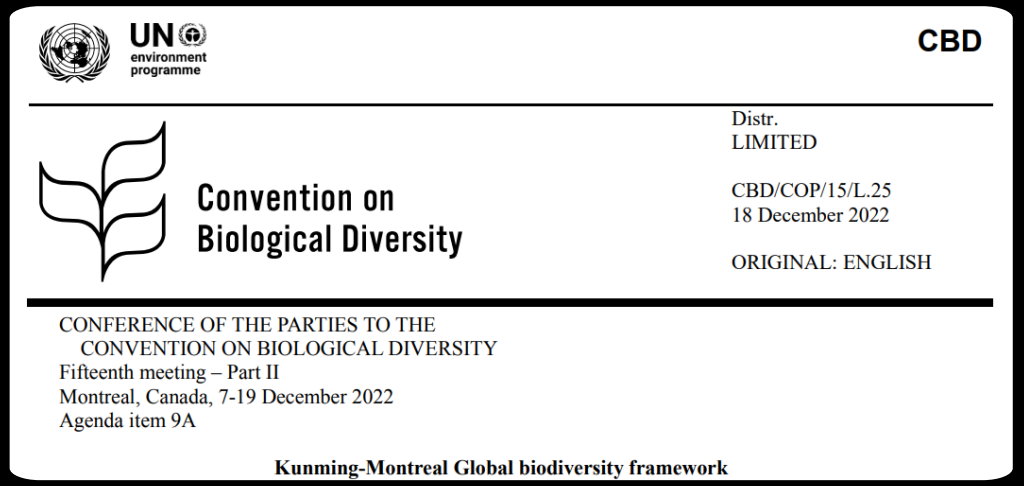
Agenda item 9A

**Kunming-Montreal Global biodiversity framework**

- TARGET 6 **Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services** by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, **reducing the rates of introduction and establishment of other known or potential invasive alien species** by at least 50 per cent, by 2030, **eradicating or controlling invasive alien species** especially in priority sites, such as islands.

# 196 Countries signed the agreement



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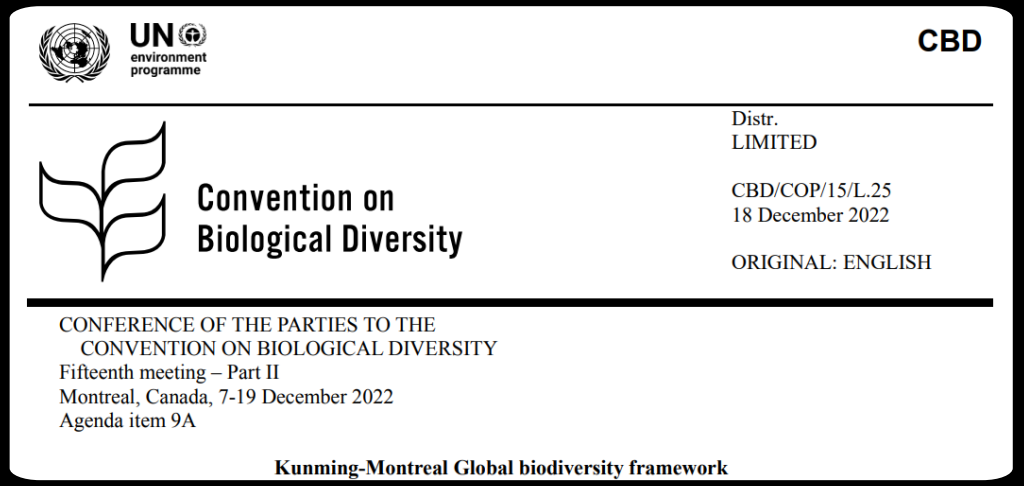
# 196 Countries signed the agreement – not the US



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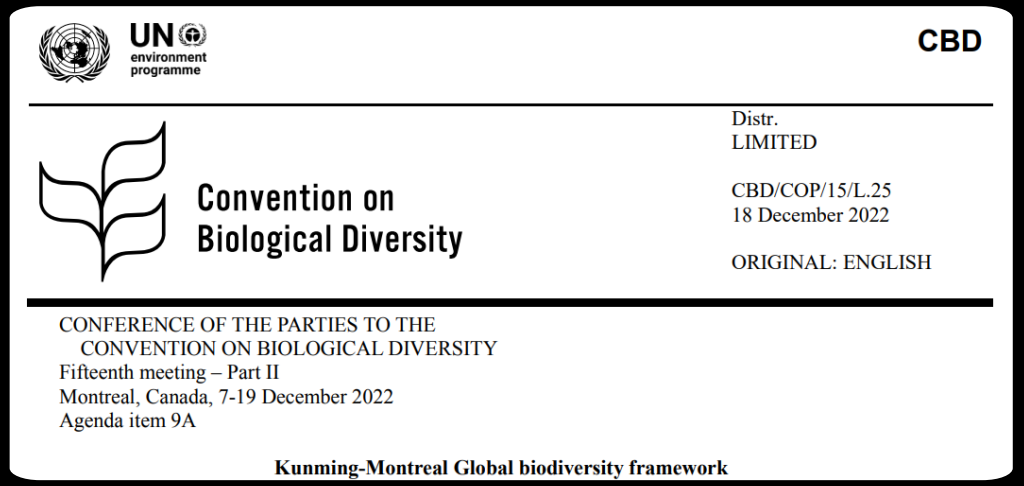
Political history – U.S requires a 2/3 vote in the Senate to ratify joining such treaties.

On the grounds of congressional concerns over international treaties impacting U.S. sovereignty over its resources, and, in spite of the Biden administration support for biodiversity protections most recently, the Senate was not in favor of approving U.S. signing of the framework in 2022.

# *We can borrow from global targets, vision, and principles to apply to our local and regional adaptive management frameworks on managing*



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# Consider cultural differences in management experience, vision, and impacts

nature sustainability

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Article | Published: 28 May 2024

**Biological invasions on Indigenous peoples' lands**

Hanno Seebens ✉, Aidin Niamir, Franz Essl, Stephen T. Garnett, Joy A. Kumagai, Zsolt Molnár, Hanieh Saeedi & Laura A. Meyerson

*Nature Sustainability* **7**, 737–746 (2024) | Cite this article

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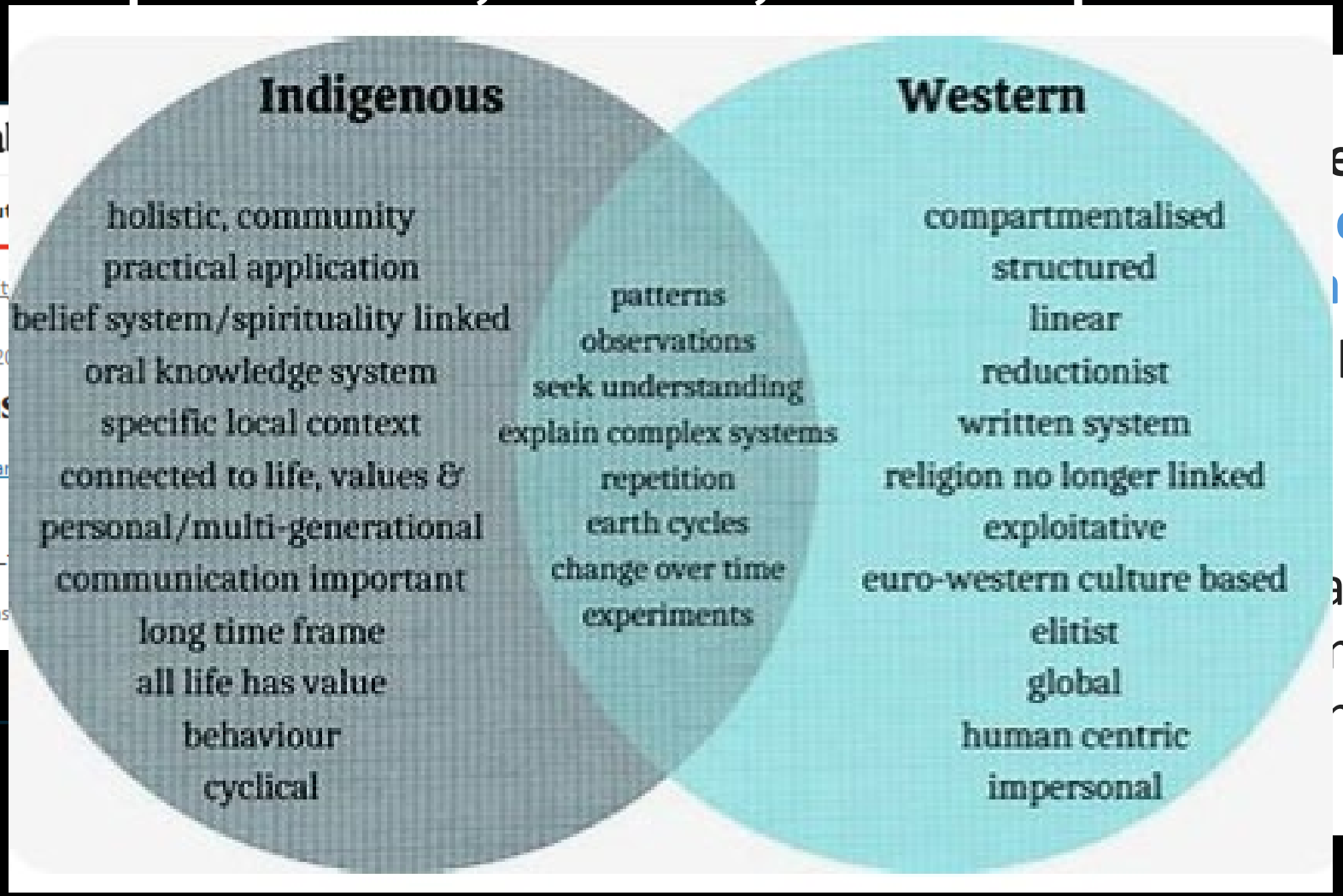
- **On average, IPLs (Indigenous People's Lands) host 30% fewer alien species relative to other lands**, after controlling for sampling intensities.

- "The difference may result from land management practices of Indigenous peoples."

# Consider cultural differences in management experience, vision, and impacts

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Article | Published: 28 May 2

Biological invas

Hanno Seebens, Aidin Nia
Saeedi & Laura A. Meyerson

Nature Sustainability 7, 737–

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# Social Science considerations – balancing public demand, interests, and philosophies


"*To me, it's the best fish that ever hit the United States," Sielicki says. "I hope it winds up going in every body of water so everybody can enjoy it*."

Fredericksburg, VA

# Lessons from the Amazon

Arapaima (Paiche)

- It is preferable to preserve native species
- But it is imprudent to ignore the economic potential a species might bring to a region

Snyder 2017. Scientific American

# Summary

- **Ecologically**: Gain experience and understanding dealing with an emergent, novel ecology in the Potomac River, the Bay and its watershed
  - Enhanced security to limit invasions
  - Support greater research and management of native species

- **Social science and education**: Opportunities for applied research understanding to influence behavior change
  - Literacy & Stewardship – Pets, ownership, and responsibility
  - Indigenous knowledge, practice, cultural and spiritual significance blending with Western knowledge and practice to improve resource management options and outcomes
  - Marketing mainstreaming of snakehead, blue cats – Can we eat our way out of a situation?


# Summary

- **Politically:** **C**an we rethink the management of eco-imperialistic species substitutions with native species management.
  - Can we effectively engage in blending global momentum and vision to reduce invasives at the local and regional scale.
- **Economically:** Imprudence to ignore the economic potential a species bring to a region
  - Beware of unintended consequences


*Thank you!*

*Have a great day!*