The Rosy Red Spread: Tracking and Monitoring a Potential Invasive Fish in Alberta

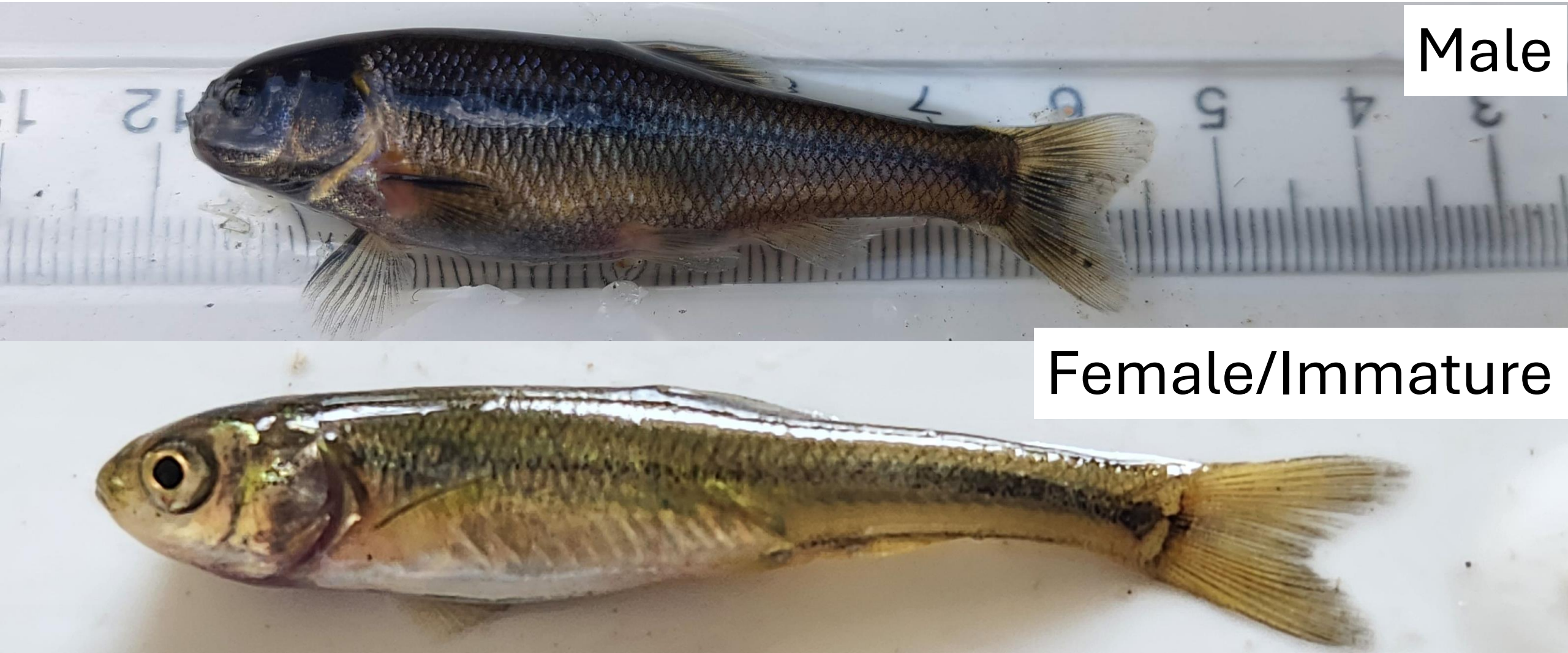
Dr. Matthew Morris, Assoc. Prof. Biology

Scan me!

Alberta Lake Management Society Conference, SAIT, 2026

9
11
15

Fathead minnow (*Pimephales promelas*)



Photocredit:
guzmana22

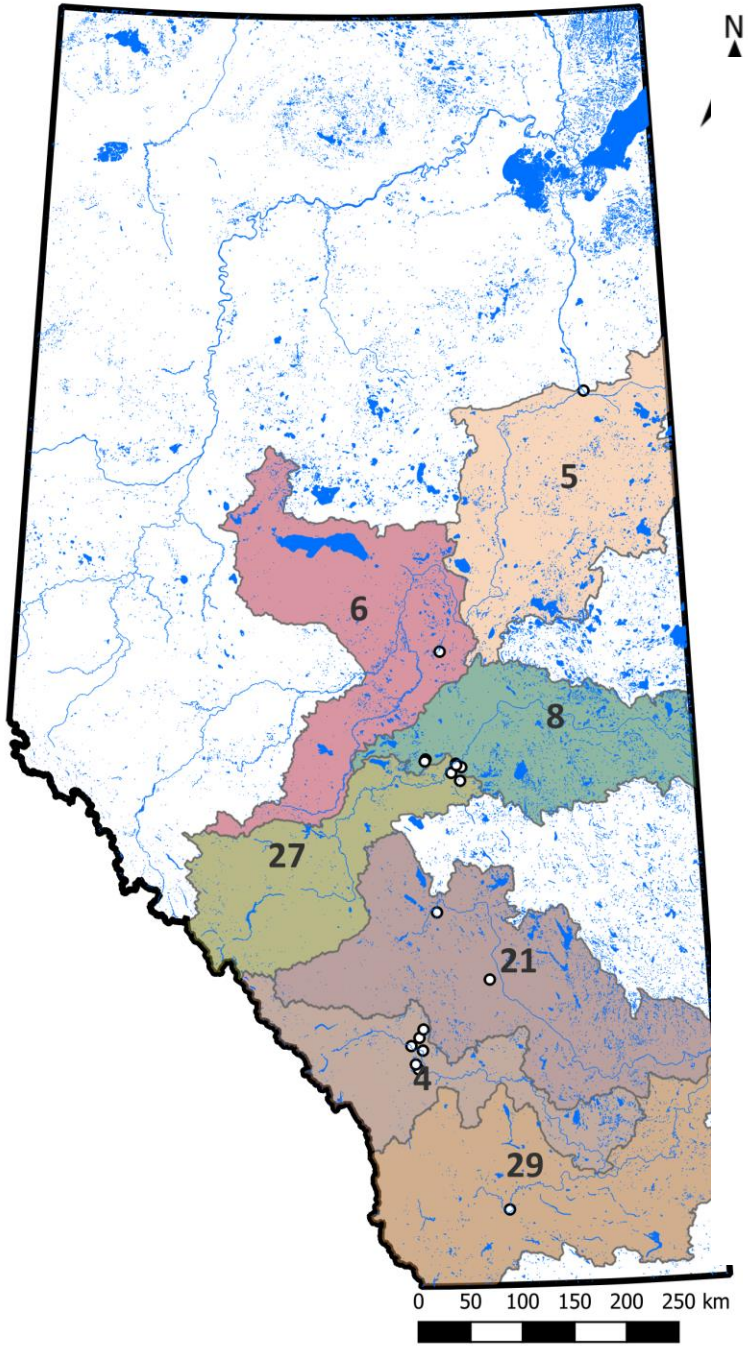
3 government records

Our initial 2024 paper:

Reported from
Fort McMurray
Edmonton
Red Deer
Calgary
Lethbridge

First occurrence: 2011

20 records
7 watersheds
17 waterbodies



The Canadian Field-Naturalist

The occurrence of introduced rosy red minnows (*Pimephales promelas*) in Alberta, Canada

Matthew R.J. Morris[1,*], Shona Derlukewich[2], and Sean McFadden[3]

[1]Biological Sciences, Ambrose University, 150 Ambrose Circle SW, Calgary, Alberta T3H 0L5 Canada
[2]School of Fish, Unit 117 3010–33 Avenue NW, Edmonton, Alberta T6T 0C3 Canada
[3]Royal Alberta Museum, 12845–102 Avenue NW, Edmonton, Alberta T5N 0M6 Canada
*Corresponding author: Matthew.Morris@ambrose.edu

Morris, M.R.J., S. Derlukewich, and S. McFadden. 2024. The occurrence of introduced rosy red minnows (*Pimephales promelas*) in Alberta, Canada. Canadian Field-Naturalist 138(1): 49–57. https://doi.org/10.22621/cfn.v138i1.3253

Abstract

Rosy red minnows are a golden morph of Fathead Minnow (*Pimephales promelas*) commonly sold in pet shops and used, in some jurisdictions, as baitfish. They have formed several naturalized populations in British Columbia, where they are considered a priority conservation concern. The Government of Alberta had noted two occurrences of rosy red minnows in 2016 and 2017, but their identification could not be independently confirmed without photographic or physical vouchers. Based on our own collections, Royal Alberta Museum specimens, community science initiatives, and enquiries to other field researchers, we report that rosy red minnows have been present in Alberta earlier than previously thought, are likely breeding in Alberta, and have a widespread distribution from Fort McMurray to Lethbridge. Given that Alberta has native populations of wild-type Fathead Minnow, the impacts of rosy red minnows on native populations requires immediate attention.

Key words: Invasive species; aquatic invasions; freshwater; baitfish

Introduction

The spread of invasive species is likely a major contributor to biodiversity loss worldwide (WWF 2020). Freshwater habitats that would otherwise be strongly resistant to invasions have experienced substantial degradation from human activities, potentially exacerbating the threat of invasive fishes (Dudgeon *et al.* 2006). Invasive species cost the government of Alberta, Canada, an estimated $2.1 billion annually (McClay *et al.* 2004; AISC 2022), yet the ecological costs of aquatic invasions are poorly understood, and may be complex. For example, the release of aquarium fish into Banff Hot Springs has been implicated in the extinction of Banff Longnose Dace (*Rhinichthys cataractae smithi*; Renaud and McAllister 1988), while introduced Whirling Disease (*Myxobolus cerebralis*) has impacted local salmonid populations (AEP 2018; James *et al.* 2021). The current spread of Prussian Carp (*Carassius gibelio*) throughout southern Alberta has had potentially negsuccessful introductions begin with small population sizes, species in the early stages of invasion are difficult to detect; by the time they are detected, the species may have spread so far and increased in abundance so much that prevention is no longer feasible (e.g., Prussian Carp in Alberta; Docherty *et al.* 2017). Given the many unknowns about the threat of aquatic invaders in Alberta, the early detection of potentially invasive aquatic species is vital to ensure the future flourishing of local fishes.

One of Canada's newest invasive species is rosy red minnow, reported to be a colour variant of Fathead Minnow (*Pimephales promelas*; Government of Alberta 2023). First discovered in an aquaculture facility in Arkansas, USA in the early 1980s, the rosy red minnow (known commonly as rosy reds) combined the hardiness of Fathead Minnow with the beauty of Goldfish (*Carassius auratus*; Sutton 2018), making it an attractive option for live bait. Captive breeding of rosy red proved to be highly successful with aquar-

Rosy red (*Pimephales promelas*)

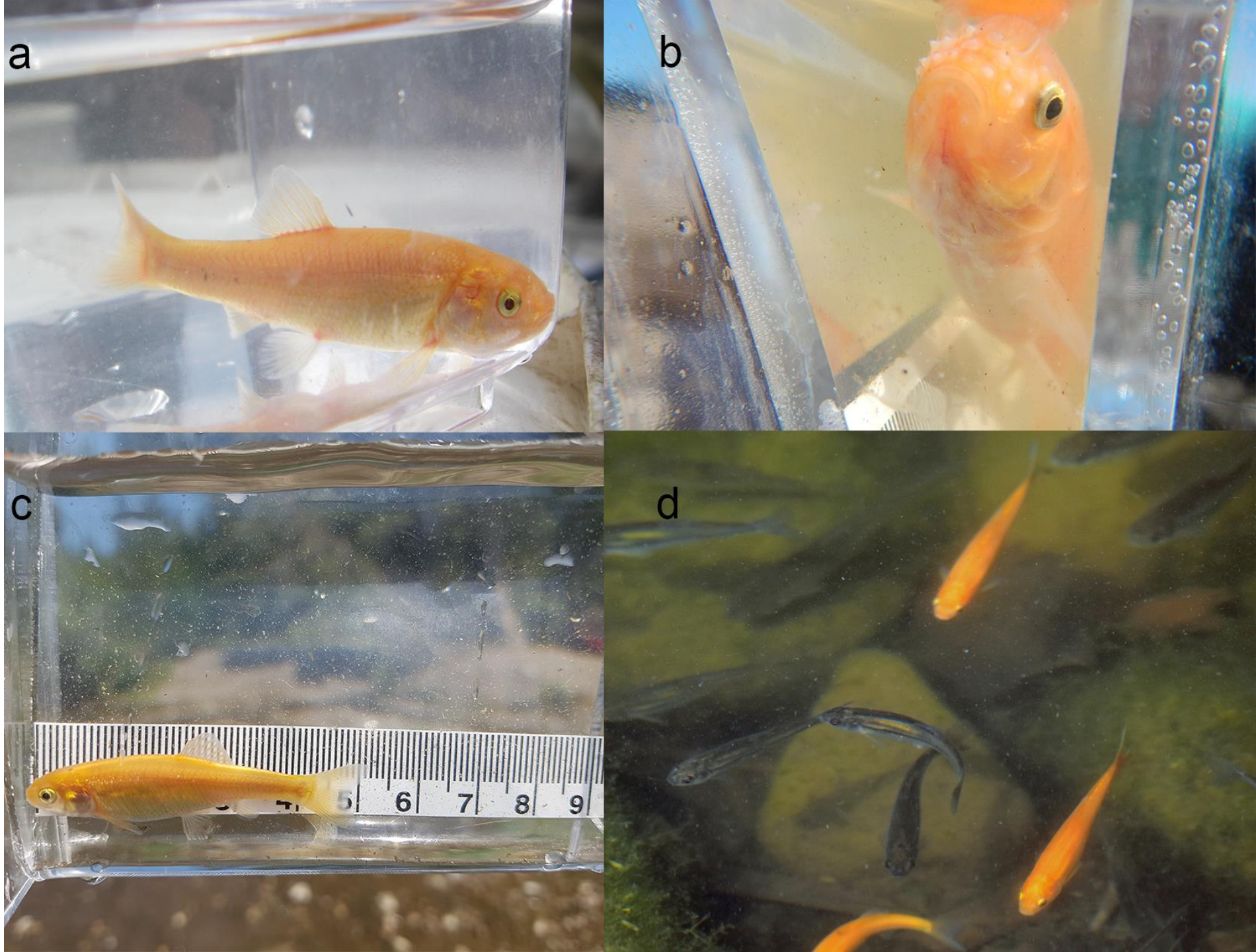


Figure from:
Morris et al. 2024

New first record: 2007, Calgary

Photocredit: Freshwater Conservation Canada

Pace of discovery increasing

Morris et al., 2024

20 Occurrences

17 Waterbodies

Operation 3R 2026

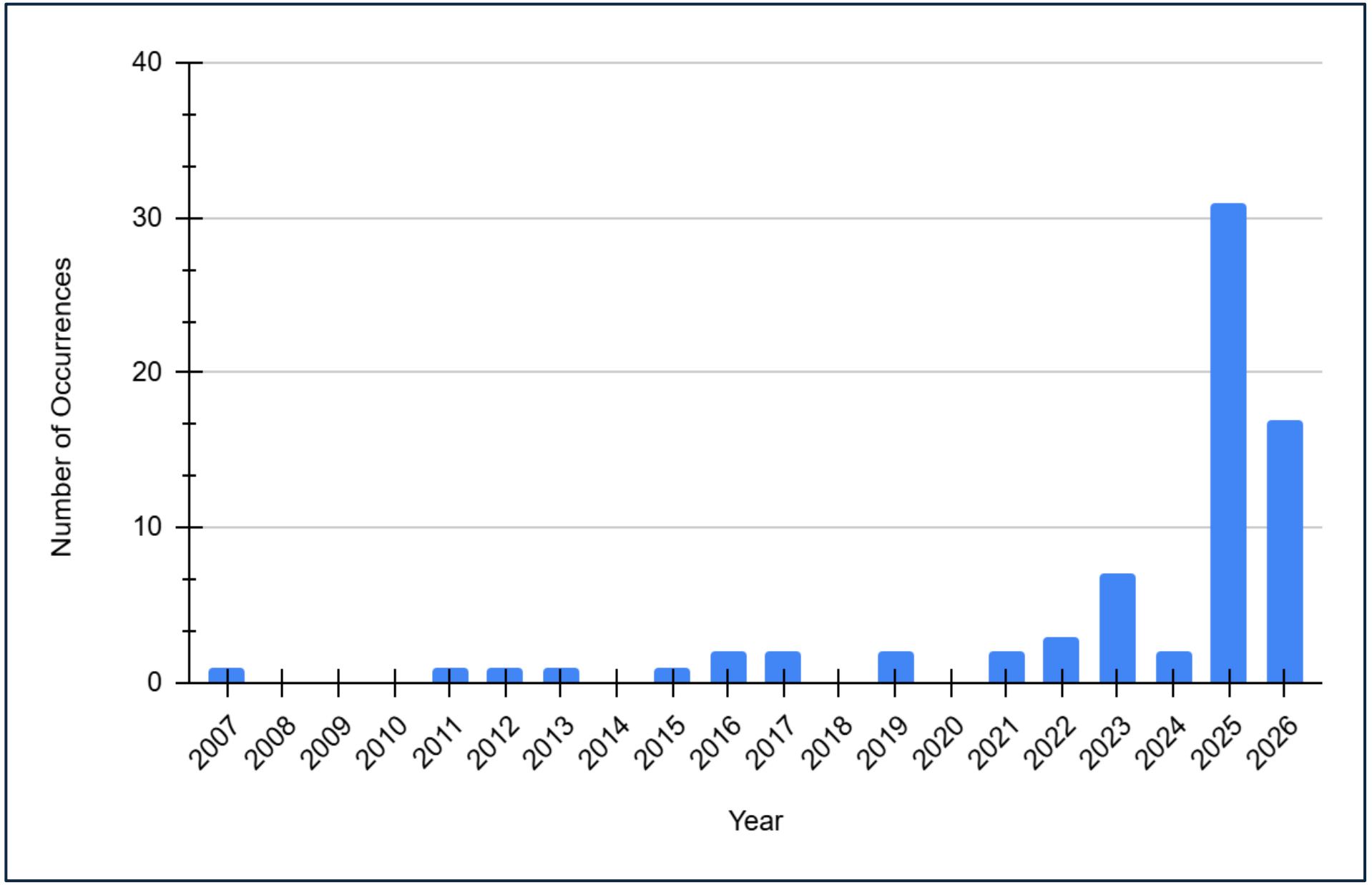
+69 Occurrences

+31 Waterbodies

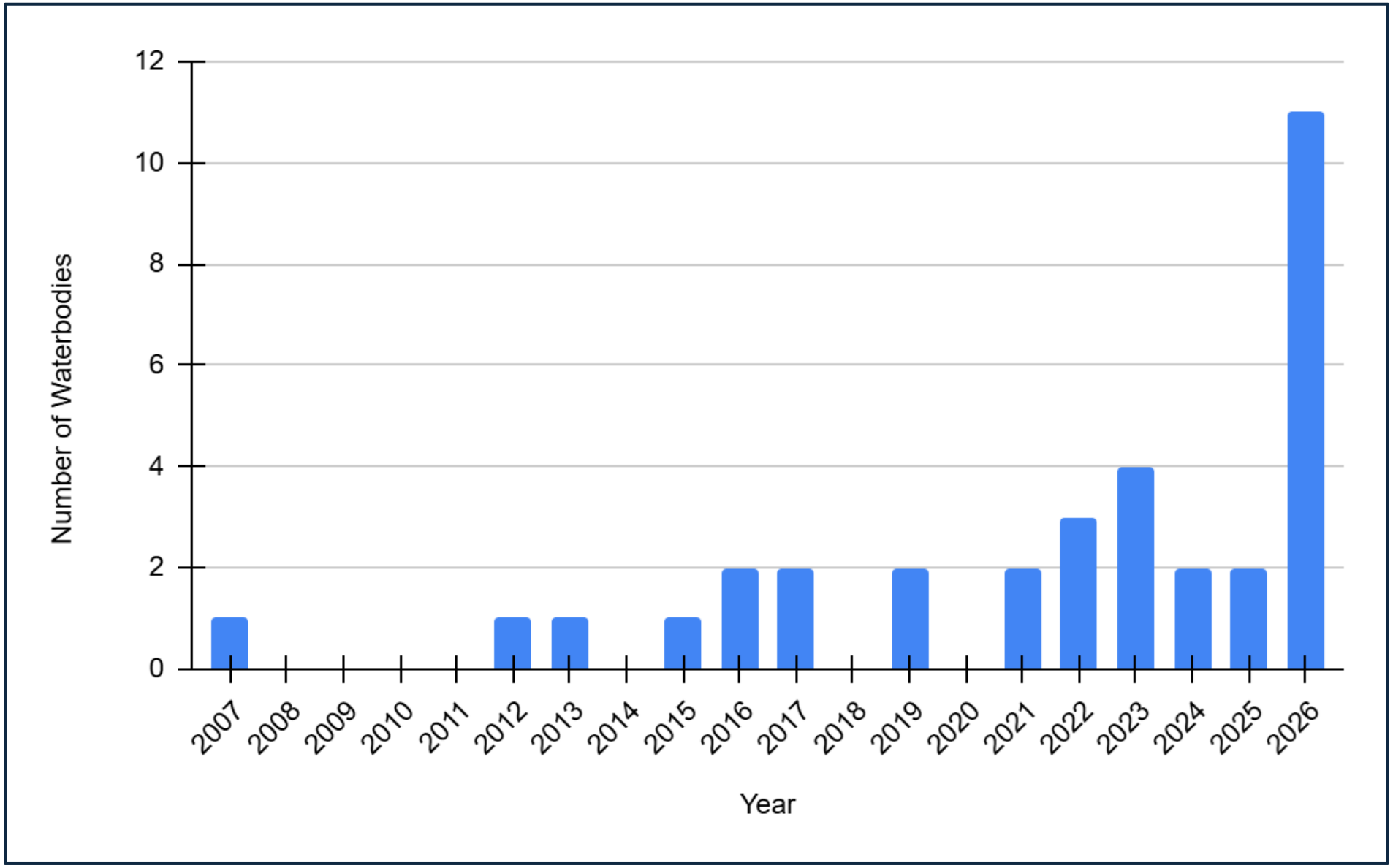
Grand Total

89 Occurrences

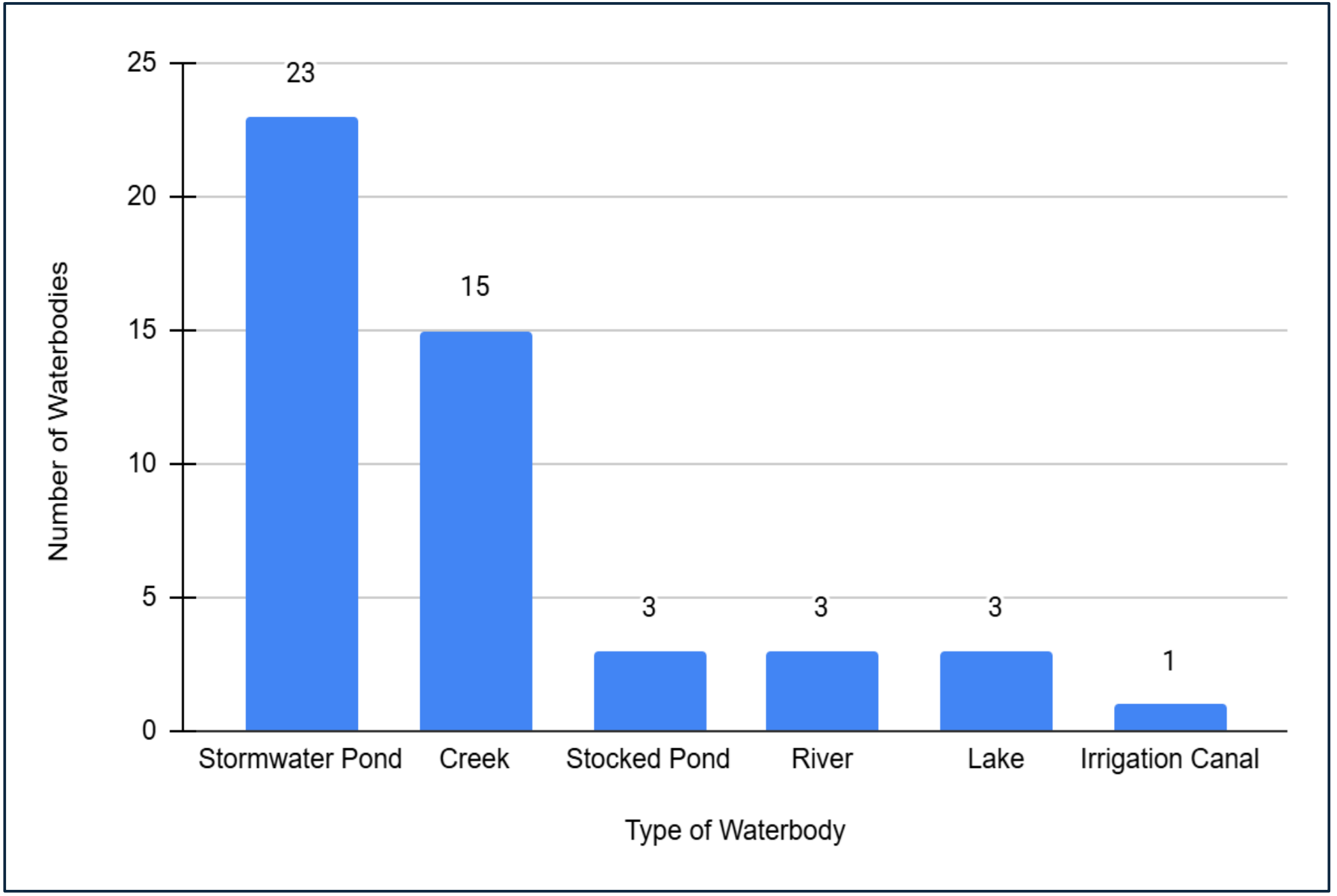
48 Waterbodies



*17 occurrences do not have reliable dates



*13 waterbodies do not have reliable dates


25
20
15
10
5
0
Number of Waterbodies
23
15
3
3
3
1
Stormwater Pond
Creek
Stocked Pond
River
Lake
Irrigation Canal
Type of Waterbody

Rosy reds are here.

Where did they come from?

Pet stores

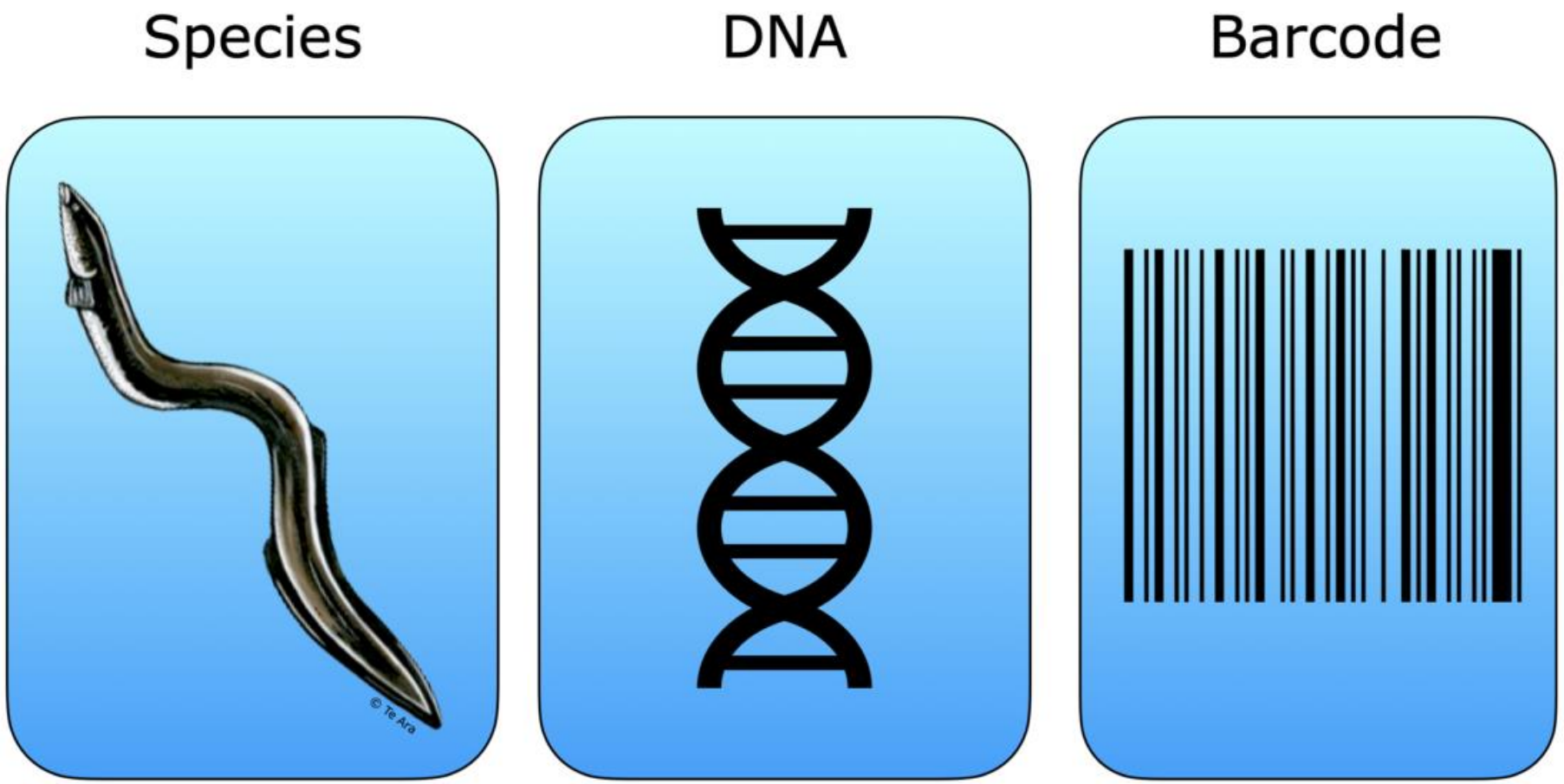
- Feeder fish
- Supplier in N Calgary

- Illegal bait
- Illegal pet releases

Hypothesis: rosy reds are pet store releases

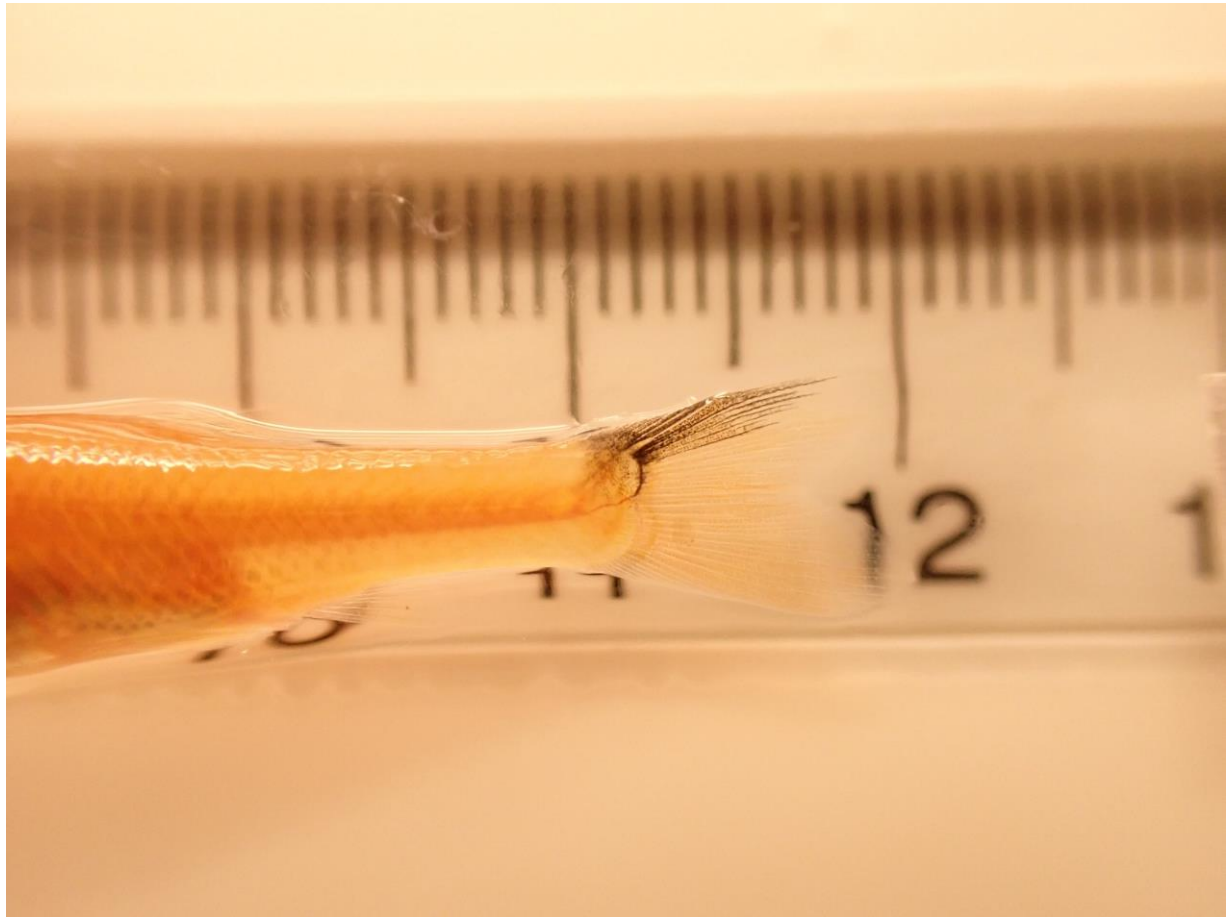
Prediction: wild-caught rosy reds should be genetically similar to pet store rosy reds and distinct from fathead minnows

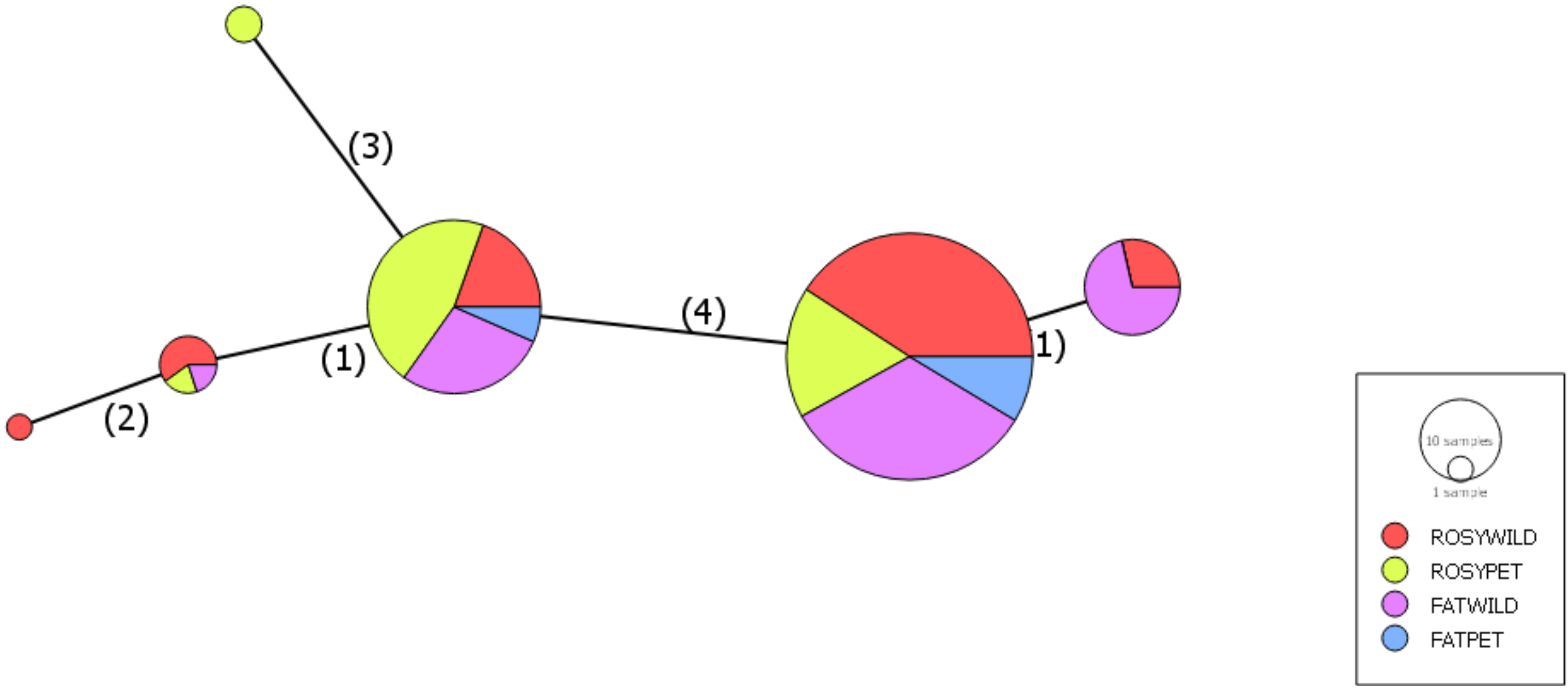
DNA barcoding: gene *COI*

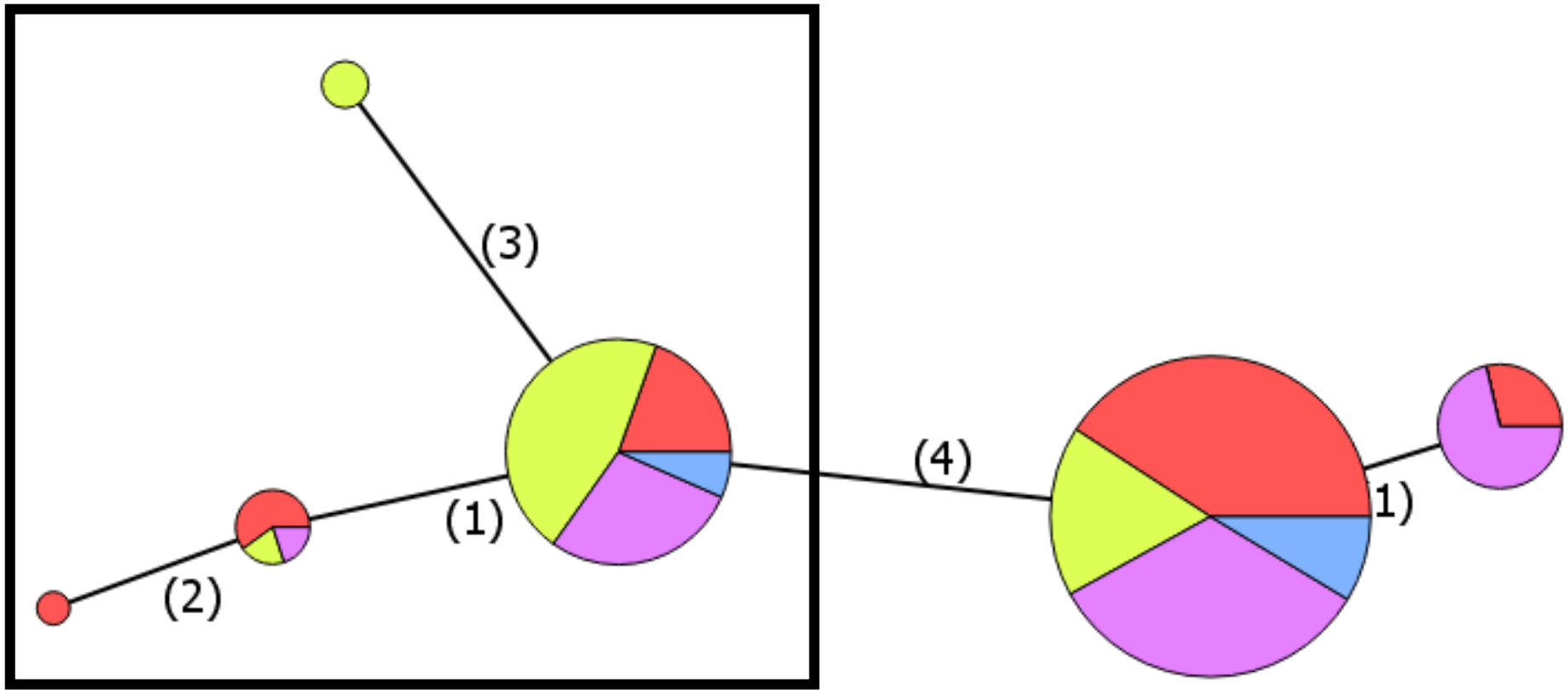


DNA

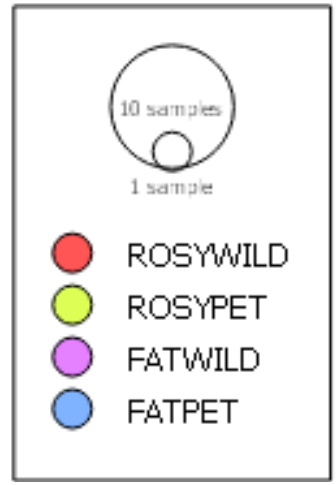
- 161 barcoded fish
  - 56 wild rosy red
  - 54 wild fathead minnow
  - 51 pet store minnows

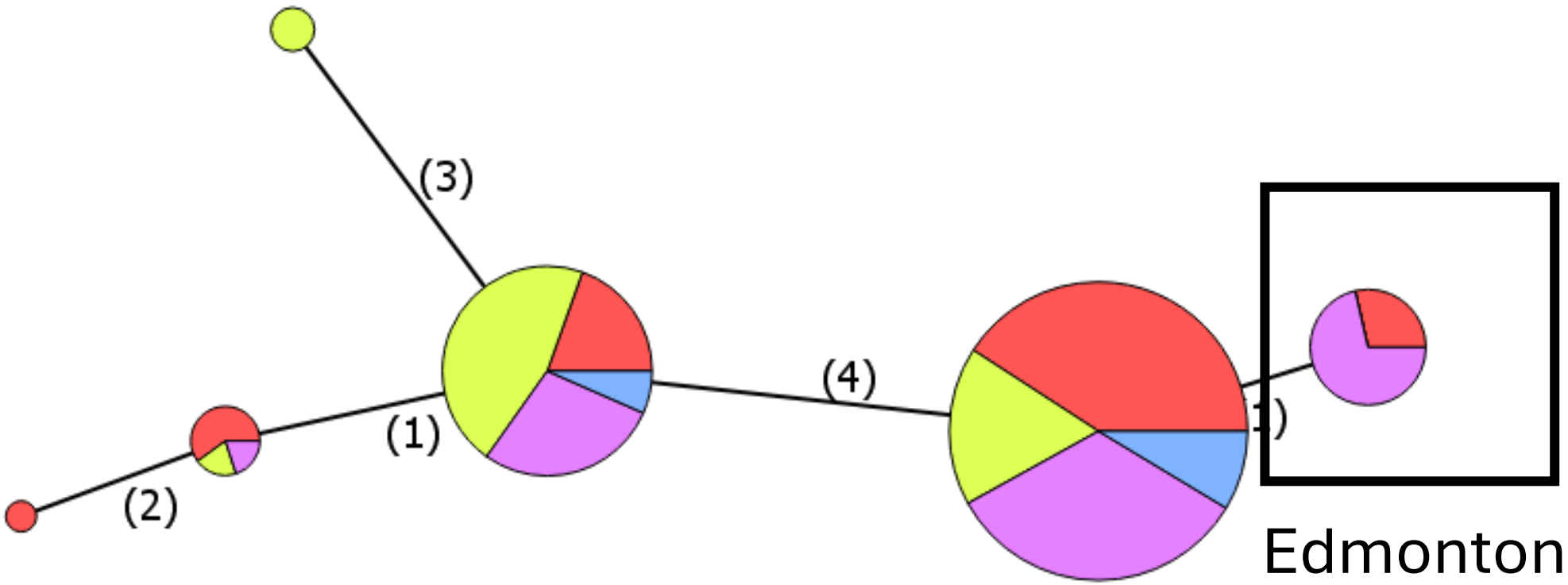


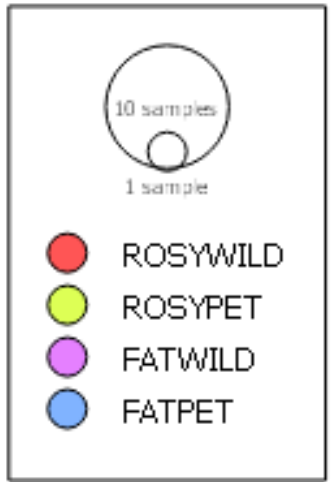

(3)
(1)
(2)
(4)
1)
10 samples
1 sample
ROSYWILD
ROSYPET
FATWILD
FATPET

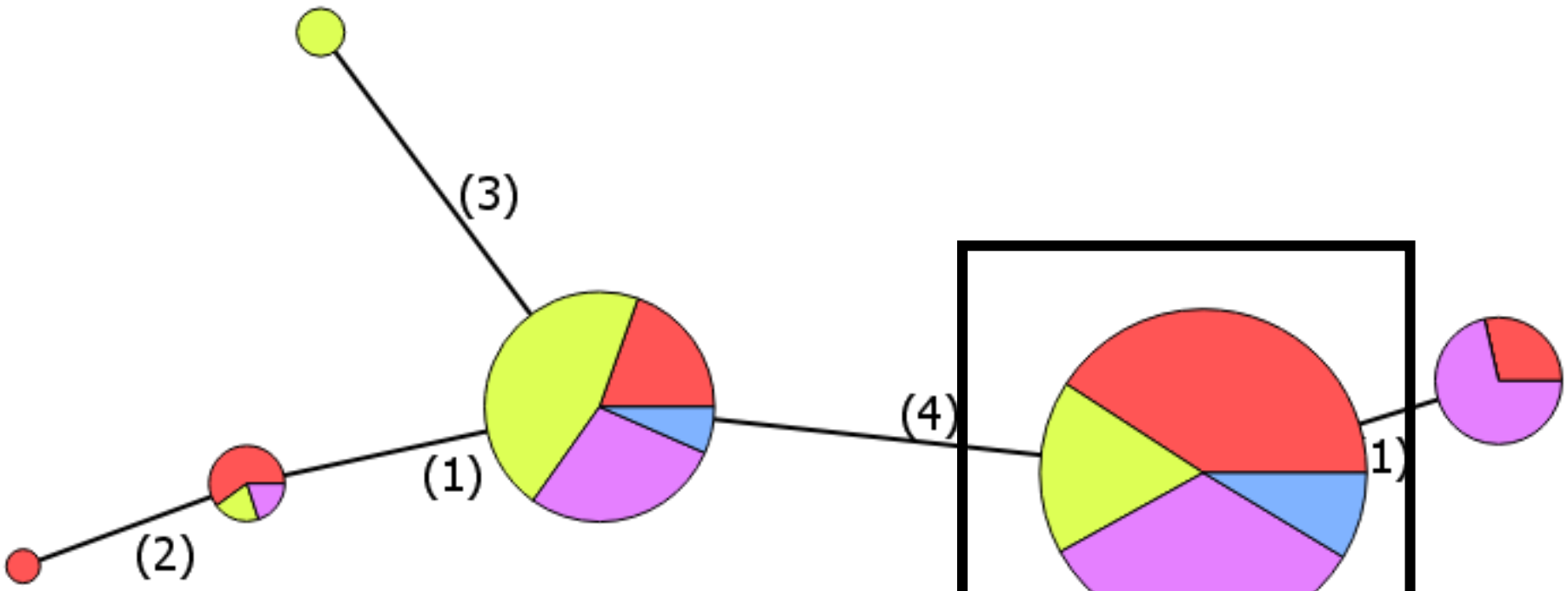


Calgary

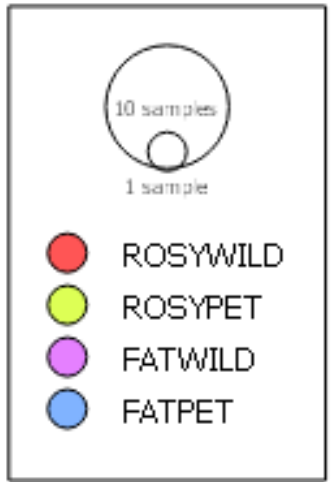



(3)
(1)
(2)
(4)
1)
Edmonton


10 samples
1 sample
ROSYWILD
ROSYPET
FATWILD
FATPET



Calgary + Edmonton



Haplotype data unclear

Pet store fatheads caught in wild?

Pet store x wild mating?

COI not a good marker?

2026:
first all-rosy population discovered in Harmony

Potential threats

Disease and parasite spread

Michel et al. 1986
Iwanowicz and Goodwin 2002
Choudhury et al. 2006

Invertebrate community changes

Hanson and Riggs 1995

Prussian carp spread

Docherty et al. 2017

Genetic changes to wild fathead minnows

Morris et al. 2010*
Harvey et al. 2016*
*fatheads not studied

Think you've seen a rosy red?

- Call the AIS hotline at 1-855-336-2628
- Post your observations on EDDMapS or iNaturalist
- Email justinjpoon44@gmail.com and matthew.morris@ambrose.edu

Photo Credits: Charlie Myles

Thank you!

- **Justin Poon**
- Sean McFadden
- Shona Derlukewich
- Royal Alberta Museum
- Funding: Alberta Conservation Association

Alberta Conservation Association

ROYAL ALBERTA MUSEUM

ALBERTA invasive species COUNCIL

AMBROSE UNIVERSITY

Scan me!