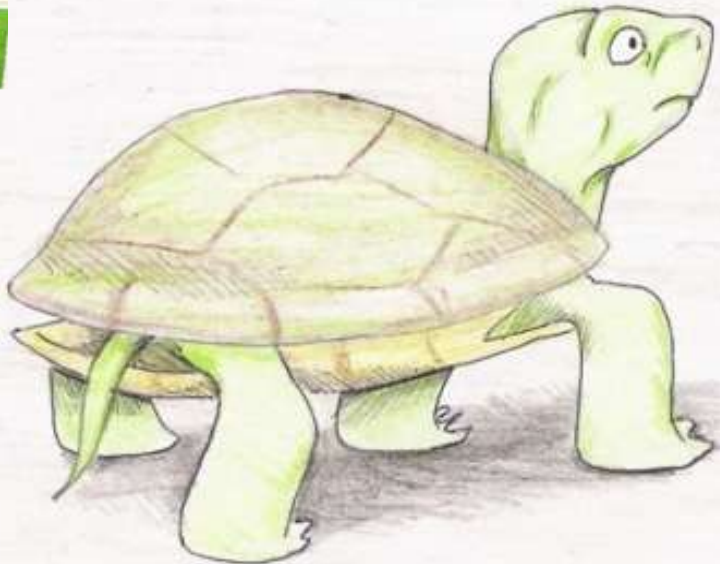


Classroom activities as consumers of organisms in the trade and pathways for invasive species: turning a dilemma into solutions

Sam Chan, Tania Siemens and Jennifer Lam *
Sea Grant College Program
Oregon State University
samuel.chan@oregonstate.edu



Artwork by Shannon Ritter, 12th Grade, Glencoe HS, Hillsboro, Oregon, USA

Thanks to our Partners

Survey in 6 States, 2 Canadian Provinces



Fisheries and Oceans
Canada

Pêches et Océans
Canada



Cornell University



Chicago Zoological Society
Inspiring Conservation Leadership



WOODLAND PARK ZOO



CLASS, TODAY WE'RE GOING TO STUDY WHY IT'S BAD TO INTRODUCE INVASIVE SPECIES...



▶ Science News for Students

▶ Student Resources

▶ Broadcom MASTERS

▶ Intel ISEF

▶ Intel STS

EUREKA! LAB

PRINTER-FRIENDLY VERSION

Teachers: Can they be eco-villains?

Releasing a newt after class may not be good for the environment

BY BETHANY BROOKSHIRE 1:05PM, OCTOBER 29, 2013



A red-eared slider, one of the turtles used in classrooms, is also an invasive species.

Greg Hume

Many science teachers talk with their students about invasive species. They may talk about cases when foreign species have killed off the native species. They may even talk about how dangerous this is, and warn their students against releasing that [pet python](#). But do these teachers practice what they preach? Many don't, [a study finds](#).

Classroom laboratory animals and pets can be a source of invasive species — animals that could compete with, and potentially overtake, native species. And teachers could be to blame. A study presented at the [Ecological Society of America](#) meeting last year, found that one in four teachers who use live specimens in the classroom said they eventually released them into the wild. Fewer than three in 100 classroom animals were local, native species that had been intentionally raised as part of a program



Come join us for the "Spring release party" 4th grade teacher



Photo Courtesy: Tania Siemens

Schools and science curricula as potential aquatic invasive species pathways



Biological supply houses

Organism suppliers

Science curricula developers

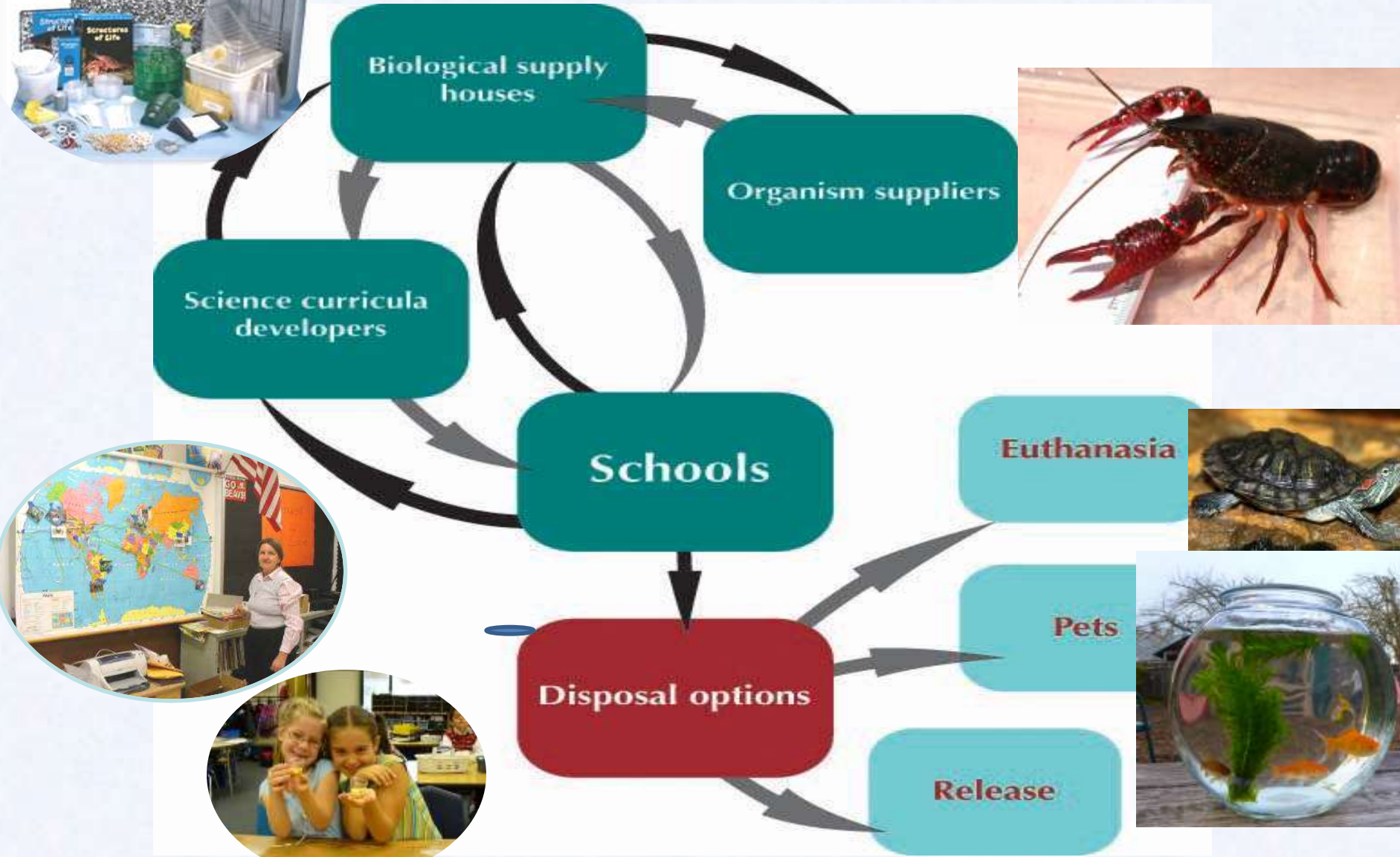
Schools

Disposal options

Euthanasia

Pets

Release



PRIMARY Biological Suppliers to Schools: **Science Education Suppliers are a \$6 Billion Business**

- Alden Forbes Laboratories
- Baltimore Biological Lab., Inc.
- Bio Corporation
- Berkshire Biological Supply Company
- Blue Spruce Scientific Supply
- Carolina Biological Supply Co.
- Connecticut Valley Biological Supply
- Fisher Scientific Company
- Gulf Specimen Marine Lab
- Marine Biological Laboratory
- Gulf of Maine, Marine Life Supply Company
- Marinus Scientific
- Mountain Home Biological
- Narco Bio-Systems, Inc.
- Niles Biological, Inc.



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- Ward's Natural Science Establishment, Inc. (~\$400 million in sales)
- SECONDARY:**
- Delta Education
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 - Flinn Scientific
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Curriculum Kits (example) often Shipped Without Scientific Names and Source



Structures of Life

Grades 3–4

WXP-742-5020 \$487.00

** Live Material Card, 12 crayfish,
12 anacharis (*Elodea* water plant)

WXP-270-4184 1 set

** Live Material Card, 12 bess beetles

WXP-270-4420 1 set



Red swamp crayfish (*P. Clarkii*) shipped from Biological Supply House



Top three crayfish for science education

Orconectes rusticus
(Rusty)



Procambaris clarkii
(Red swamp)

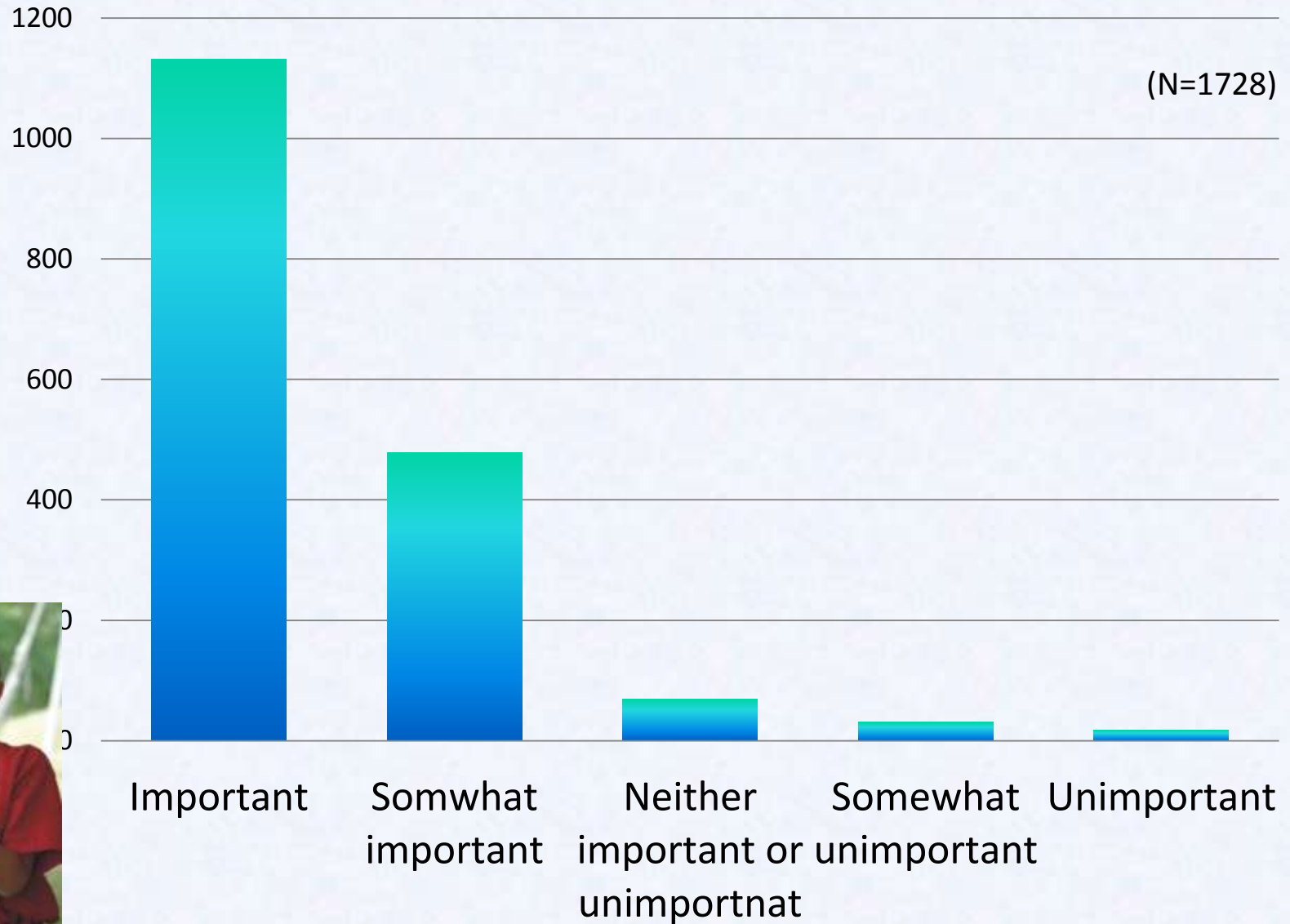


Orconectes neglectus
(Northern ringed)

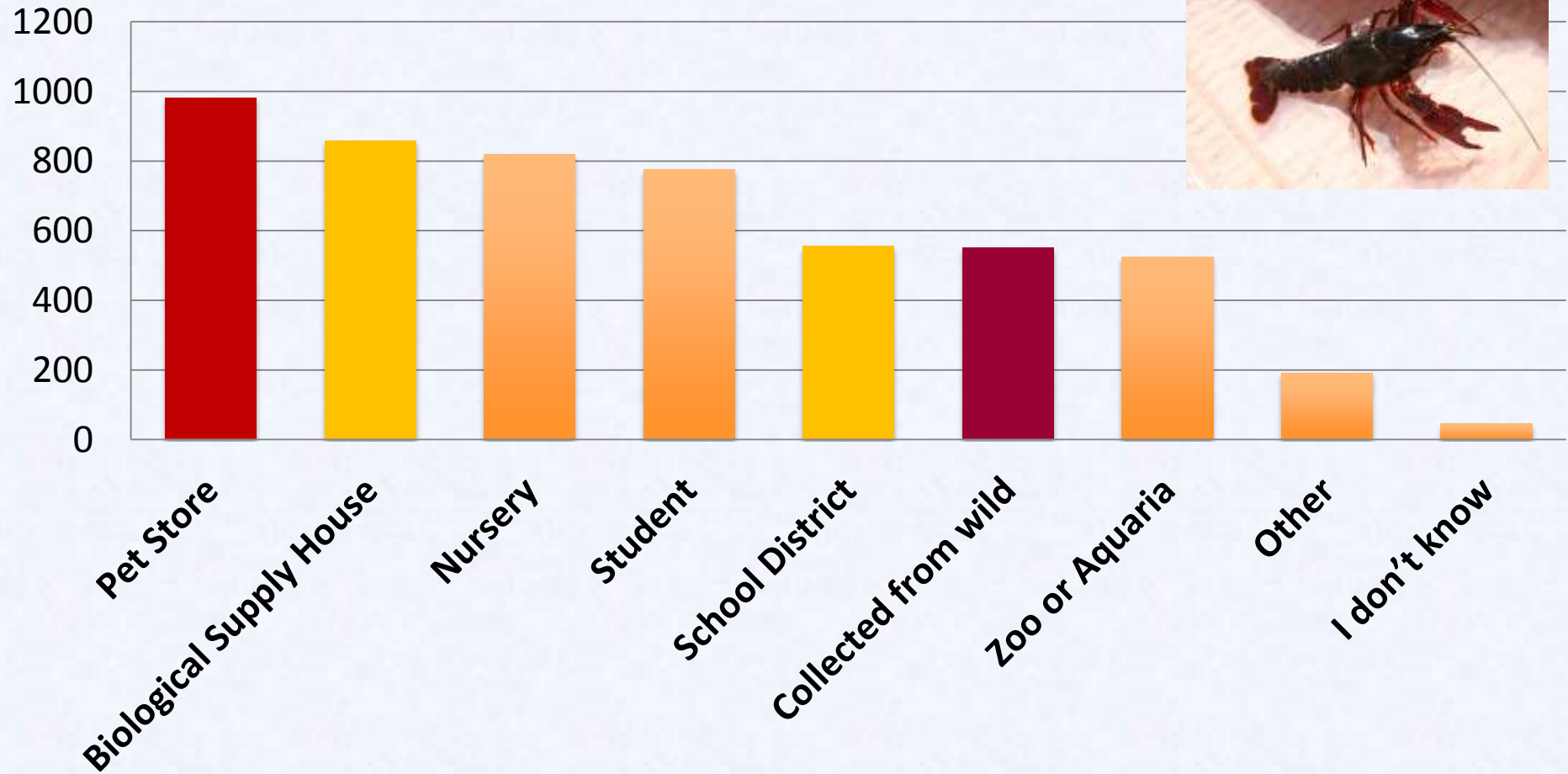
Live Plants & Animals in the Classroom – Survey of species

Summary of species list, the legal statuses, invasive/native/non-native statuses, and establishment statuses of aquatic plant/animal and land plant/animal species used in US and Canadian classrooms.

How important are live animals and plants important in the classroom?



Sources of Classroom Organisms (N=1944 Teachers)



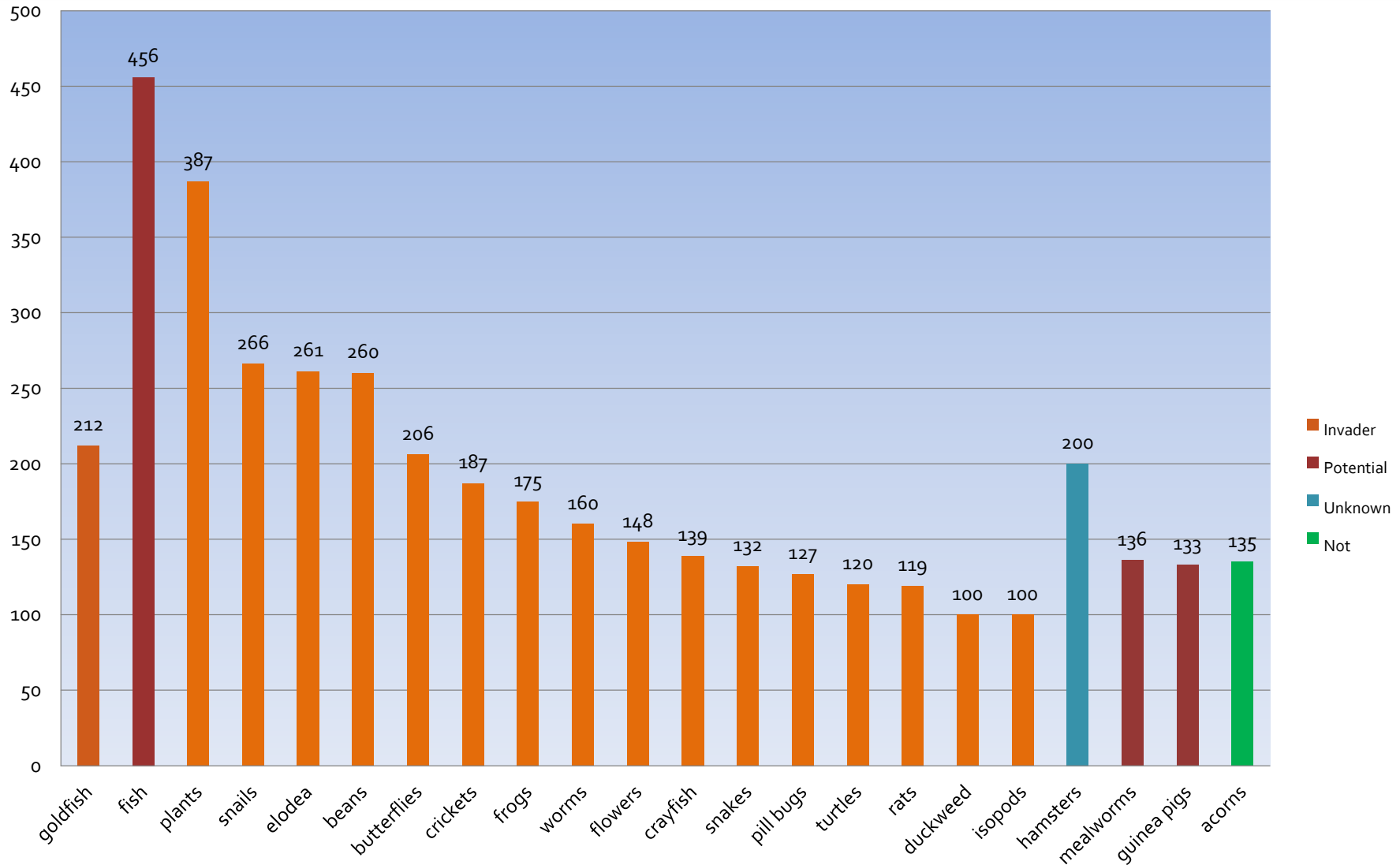
Sample responses from teacher's survey. What plants or animals have you used in your classroom?

Ball Python	Ferrets	Ferns	Mosses/Lichens	Beans
Ferrets	goats	llamas	pigs	donkey
spider plant	pathos plant	vegetables	trees douglas fir	
moths	tadpoles	butterflys	snails	sea water plants
fish	gerbils	turtles	geraniums	ferns
Elodea - aquatic plant	Swedish Ivy - houseplant	terrestrial snails (class pets)		
fish	hamster	turtle	spider plants	violets
elodeo	tropical fish	earthworm	brine shrimp	green anole
fish	snakes	turtles	cockatiles	frogs
Black Labrador Retriever	Banana Plant			
caterpillars/Butterflies	meal worm	tadpoles/fish	frogs	
clown fish	brittle star	freshwater plants		
fish	guppies	crickets	crabs	various flowers
snake	mice	various aquatic plants		
Aquarium with plants and crawdads	frog eggs			
		outside insects	moths (luna	
butterflies (painted ladies)	house plants	we've collected	moths)	earth worms
Sculpins	Crabs	Shrimp	Mussels	Barnacles
flowers	birds	small rodents		
dog	seedlings	plants	butterflies	
hamster	fish	rabbit	frogs	flowers
Peas	Daffodils	Radishes	Petunias	Dog
		red eared slider		
		turtles-until I was		
		told they're not		
		allowed		
finches	goldfish		green foliage	



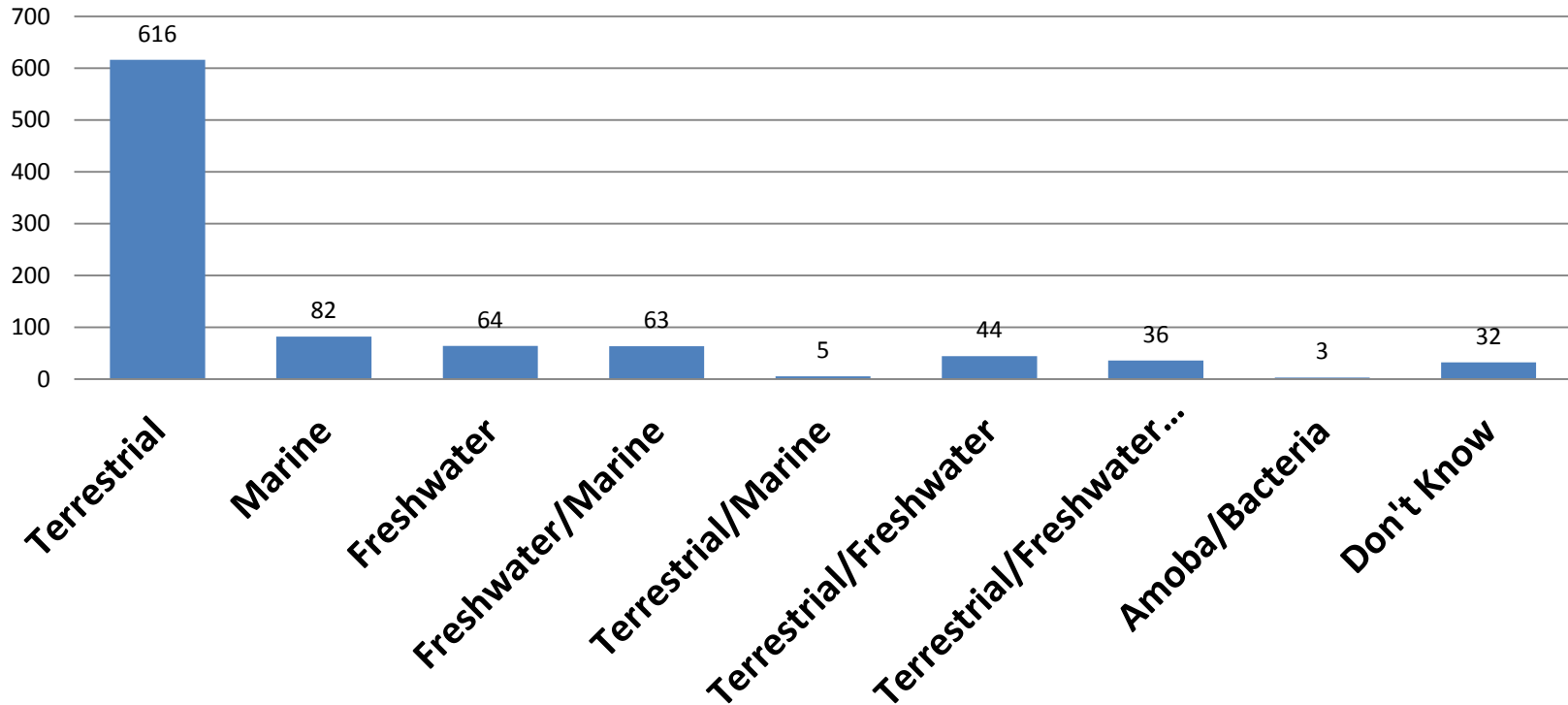
Most Abundant Classroom Plants and Animals as Reported by Teachers

*More specific species are not included



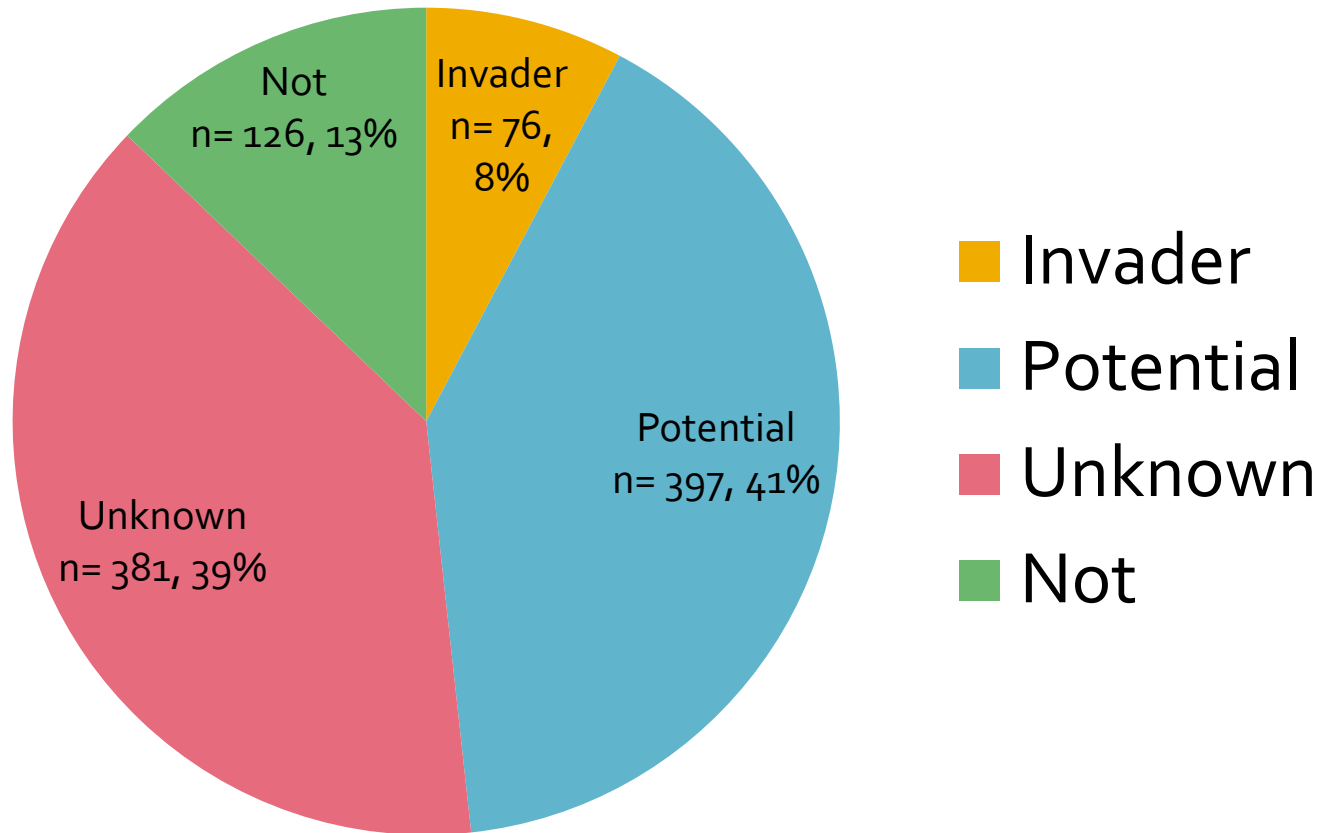
Approx. 32% of species used in the classroom are aquatic

General Habitat of Species
n=945



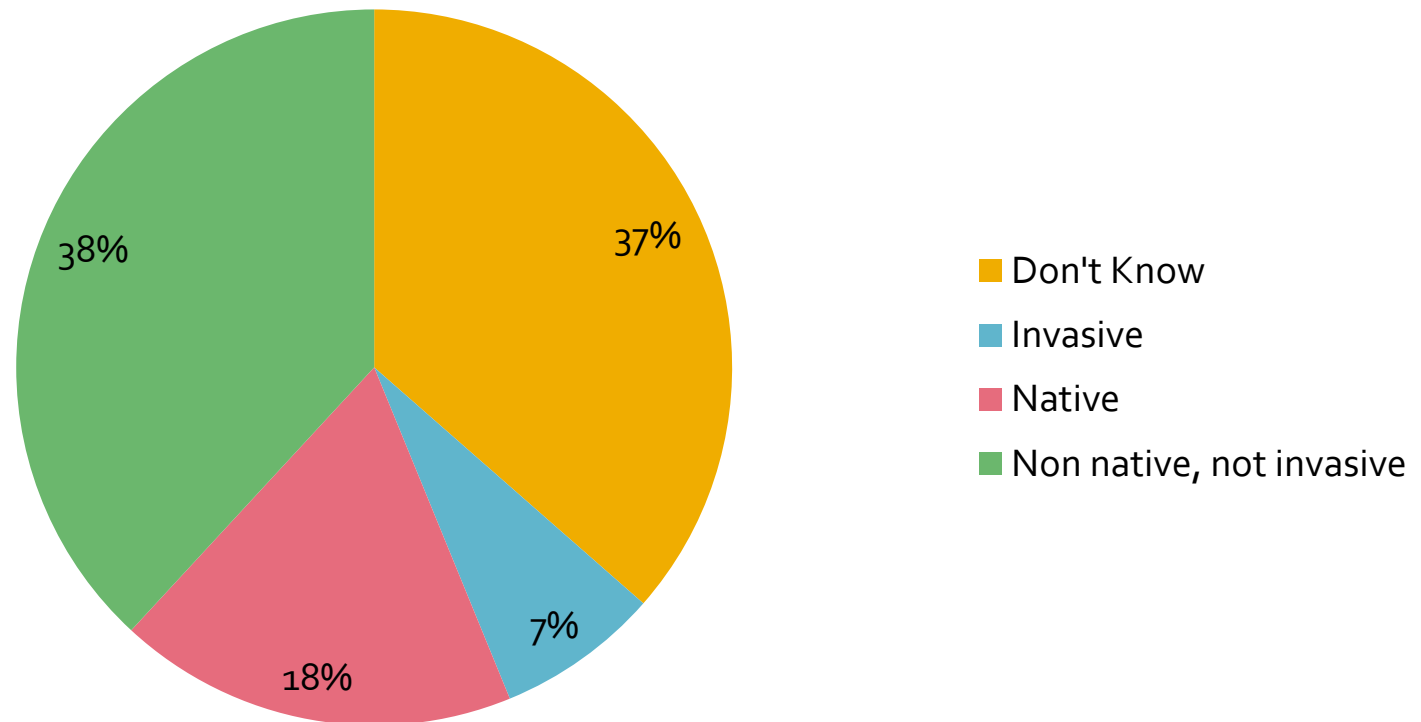
Invasive Status of Species Used in Classrooms

Single Species Reported by 1944 Teachers



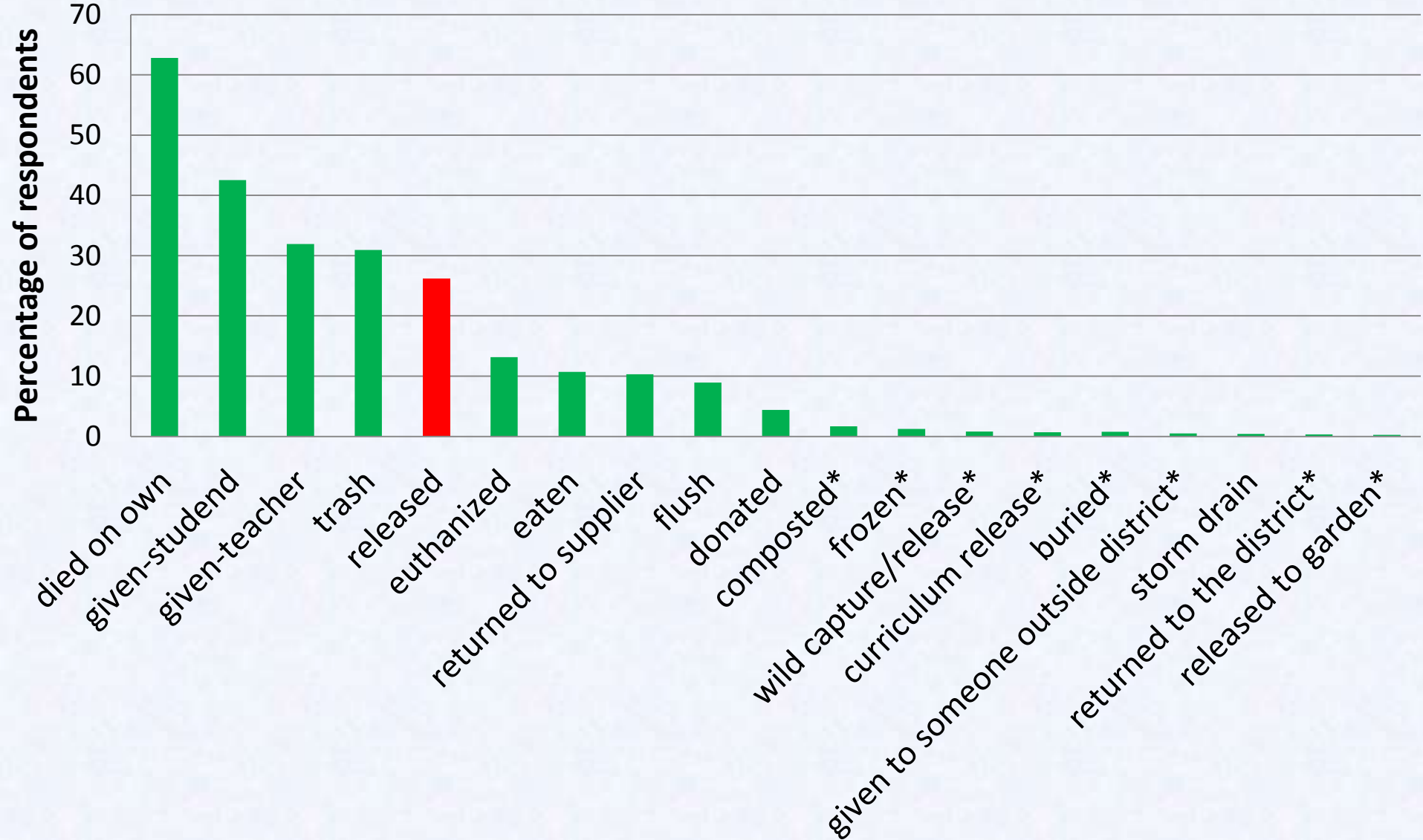
Ontario

Ontario Classroom Species Native or Invasive Status within the Province

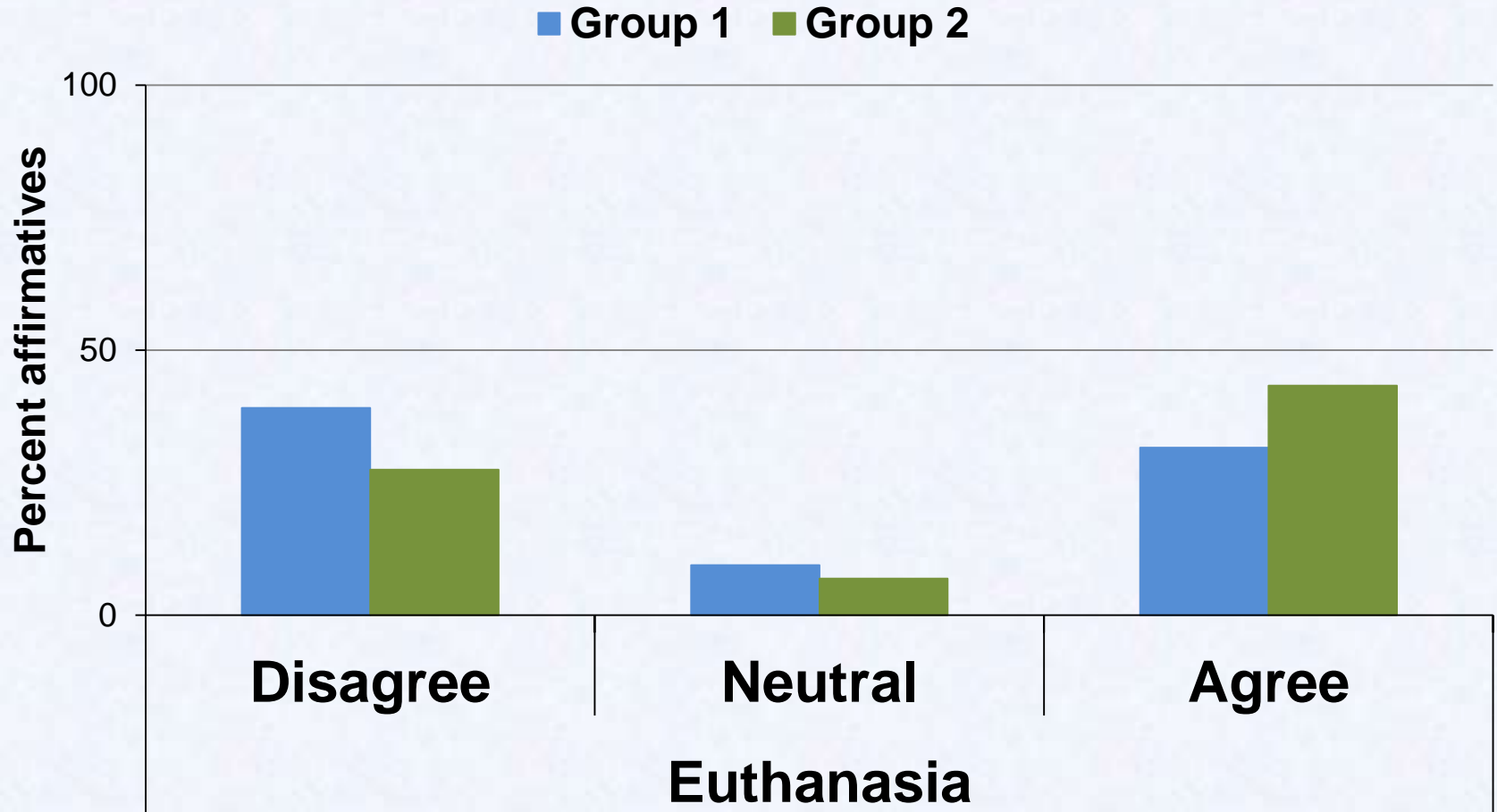


What Happens to Classroom Plant and Animals?

(N=1979 teachers)



Teacher's agreement on Euthanizing Animals Used in Classrooms (n=1944)



Communicate findings through paper at high profile conferences

ESA –Ecological Society of America and NSTA



TOPICS > SCIENCE

Classroom Culprits? Invasive Crayfish Threaten Western Waterways

March 10, 2011 at 12:00 AM EDT



MORE VIDEO

New report suggests

http://www.pbs.org/newshour/bb/science-jan-june11-pledge_03-10/

Solutions Suggested by Teachers

- **Lists of invasive/prohibited species for each region**
- **Use only native species, or ban invasives from the classroom**
- **List of BSH's that specialize in native or non-invasive species**
- **List of alternatives to species in kits**
- **Guidelines on catch/release**
- **Guidelines on care/disposal of organisms, and alternatives to euthanasia**



Not that simple to “use natives”

- Not available for much of the school year.
- State regulations only permit harvest between May and Sept
- Still need to emphasize “Don’t let it loose”



Solutions from a 4th grade class on live crayfish in the classroom

- Do not release them!
- Return them or set up aquariums at school to raise them
- Crayfish in their natural habitat are predated upon: cook, study and **eat them**
- Freeze them
- Study crayfish in-stream



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Important Notice!

Do NOT release classroom organisms into the wild. In some states, it is illegal to release organisms, even indigenous species, without a permit. The intention of these laws is to protect native wildlife and the environment.

When classroom activities are finished, the organisms can be:

- Kept in your classroom
- Donated to another classroom or Science Department
- Donated to nature center
- Humanely disposed of by freezing.
- We do not recommend home adoption by students as the organisms often go from home to the wild.

Photo Credit: Julian Olden

Adopting a Classroom Animal

Pledge Form

DON'T LET IT LOOSE!

By adopting this classroom animal, I hereby pledge to:

1. Never release or allow this animal to escape into the environment;

(Releasing an animal can be harmful to both the animal and the environment. It may be illegal to release animals and plants in your state.*)

2. Provide and properly care for the animal's essential needs (see animal care sheet on back);
3. Share this pledge with anyone wishing to adopt this or another animal.

Date: _____

Species being adopted: _____

Student (print name): _____

Student Signature: _____

Parent/Guardian (print name): _____

Parent/Guardian Signature: _____

Teacher (print name): _____

Teacher Signature: _____

*Please check with your state wildlife agency/local natural resource agency or visit www.lbaagrant.org/speciesregs regarding the regulation for your state.

DON'T LET IT LOOSE!

It's bad for your pets. It's bad for the environment.

DISPOSE OF CLASSROOM PLANTS AND ANIMALS PROPERLY!



WHY SHOULDN'T I RELEASE CLASSROOM PLANTS AND ANIMALS INTO THE WILD?

Common aquatic plants and animals can become invasive when released into the wild, including:

- ✓ goldfish and other aquarium fish
- ✓ Chinese mystery snail
- ✓ alder, hydrilla, and other aquarium plants
- ✓ crayfish
- ✓ red-eared slider turtle

WHAT DAMAGE DO INVASIVE SPECIES CAUSE?

- ✓ Degradate aquatic habitats
- ✓ Outcompete desirable native species
- ✓ Decrease biodiversity
- ✓ Alter food chains
- ✓ Introduce diseases
- ✓ Limit recreation
- ✓ Damage infrastructure
- ✓ Contaminate water resources
- ✓ Necessitate expensive controls



WHAT IF MY CLASSROOM PLANT OR ANIMAL IS NATIVE TO MY REGION?

Even if your plant or animal is native to your region, it may carry diseases and should never be released into the wild.



Chinese mystery snail



Red-eared slider turtle



WHAT SHOULD I DO WITH UNWANTED CLASSROOM PLANTS AND ANIMALS?

PLANTS: Completely dry or freeze aquatic plants, then put them in your garbage. Composting should be avoided, as seeds can still sprout.

FISH, INVERTEBRATES, AND REPTILES: Return to the seller or find them a home with a friend or neighbor. Ask the seller/pet store to take a pledge** not to release. If you cannot find a new home for your animal and you need to consider euthanasia as an option, consult a veterinarian.

WATER: The water that contained your aquatic plants or animal could be contaminated and should be sterilized. To sterilize, add 2 drops of bleach for each quart (about 1 liter) of water; 1/4 teaspoon for each gallon, or 5 tea spoons for 10 gallons of water. Put the sterilized water down the toilet or sink—never down a storm drain.



PACKAGING: Invasives can also hide in pack aging. Respect packaging and remove any viable plants or animals. Rinse containers with a bleach solution that contains 2 fluid ounces of bleach per quart of water (or 1/4 cup bleach per gallon of water). Dispose of it in your garbage.

LEARN HOW YOU CAN TAKE ACTION ON THESE WEBSITES!

An urge for teachers and students to learn about aquatic invaders:

www.invasives.org/health/index

Educational tool kit on Aquatic Invasive Species:

<http://aquaticinvasives.org/>

Invaders in your area tool kit:

www.invasives.org/health/index

* Classroom animal adoption pledge:

www.invasives.org/health/index

www.invasives.org/

**Aquatic species regulations database:

[www.invasives.org/](http://aquaticinvasives.org/)

Ways you can prevent invasions:

www.invasives.org/health/index

The Urban Ocean Program at USC Sea Grant:

<http://www.usc.edu/urbanocoprogram/>

Information from Canada about invasive species:

www.invasivespecies.ca/

THINKING OF GETTING A CLASSROOM PLANT OR ANIMAL?

- ✓ Plan ahead and research the best species to use in your classroom. Select species that are native or non-invasive.
- ✓ Use the aquatic species regulations database** as a resource.
- ✓ Develop a plan for future care or disposition of the animal or plant in case it can no longer be held in your classroom.



David H. and Edna Davis
University of Arkansas System Sea Grant
Cape Fear Center
Wilmington, NC 28403



ANSTF Classroom Guidelines for Preventing the Introduction and Spread of Aquatic Invasive Species (AIS)



HabitattitudeTM
PROTECT OUR ENVIRONMENT
DO NOT RELEASE FISH AND AQUATIC PLANTS
PFIAC • U.S. FISH & WILDLIFE SERVICE • NOAA'S SEA GRANT
www.habitattitude.net

- **Report** suspicious shipper
- **Dispose** of unwanted organisms
- **Sterilize** never clean
- **What to do**

- ✓ **Inspect** live study specimen orders and remove unwanted seeds, plants or animals
- ✓ **Give** unwanted organisms to another school, environmental learning center, aquarium or zoo
- ✓ **Sterilize** discarded water and **drain** water away from water bodies – never down a storm drain
- ✓ **Dispose** of aquatic plants and packaging materials in a sealed plastic bag in the trash
- ✓ **Contact** a veterinarian or pet retailer for guidance on human disposal of animals

Structures of Life Extension: Learning about Invasive Species through Art and Science

By Danielle Goodrich, Tania Siemens, Jennifer Lam, Sam Chan, Oregon Sea Grant College Program, Oregon State University and Jeff Adams, Washington Sea Grant; Julian Olden, University of Washington; Linda Chilton, USC Sea Grant; Marsha Gear, California Sea Grant; and Thea Hayes, Portland Public Schools, Portland, Oregon



FIGURE 1: STONE SOUP © JAN ELIOT. REPRINTED WITH PERMISSION OF UNIVERSAL UCLICK. ALL RIGHTS RESERVED.

In a wonderful blend of art and science, nationally syndicated *Stone Soup* creator Jan Eliot depicts her character Alix, a young girl and “budding” scientist, innocently releasing an invasive crayfish into the wild. The comic strip series

crawdad), are vital to helping students understand science, and stimulating inquiry to the world outside of the traditional classroom. Yet, after the lesson, teachers must decide what to do with the organisms, and it is important



Classroom Guidelines in Preventing the Introduction and Spread of Aquatic Invasive Species



- Sam Chan, Jennifer Lam, Tania Siemens, Tim Miler-Morgan, DVM and Danielle Goodrich, [Oregon Sea Grant](#)
- Linda Chilton, [USC Sea Grant](#)
- Marsha Gear, [California Sea Grant](#)
- Jeff Adams, [Washington Sea Grant](#), Julian Olden, [University of Washington](#)
- Robin Goettel, Pat Charlebois, Danielle Hildrich, [Illinois/Indian Sea Grant](#)
- Doug Jensen, [Minnesota Sea Grant](#)
- Erika Jensen, [Great Lakes Panel](#)
- Thea Hayes, [Portland Public Schools](#), [Oregon Invasive Species Council](#), Education consultant
- Jeff Brinsmead, [Ontario Ministry of Natural Resources](#), Canada
- Robyn Draheim, [USFWS](#)
- Chuck Jacoby, University of Florida, [St. Johns River Water Management District](#), Palatka, FL & [Indian River Lagoon National Estuary Program](#)
- Wei-Ying Wong, [Philadelphia Zoo](#)
- Helen Domske, [New York Sea Grant](#)
- Rochelle Sturtevant, [NOAA GLERL](#)
- Susan Pasko, [NOAA](#)
- Laura Norcutt, [USFWS](#) consolidated reviews from the ANSTF Spring Meeting
- Isabelle Desjardins, [Quebec Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs](#)



September 03, 2013

Alix the science girl

Confession: I am a wannabe marine biologist. I get to pour my love of the natural world into the story lines I write for Alix. Because I want to make sure what I'm writing about is based on accurate facts, I have an excuse to do research. For the story appearing this week and next I contacted the Oregon State Invasive Species Expert. Who knew we had one?? Thanks, Sam Chan for the help!

<http://blogs.oregonstate.edu/breakingwaves/2013/09/03/stone-soup-draws-on-sea-grant-expert/>



ABOUT

Blog



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About Jan



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Cartoon Reprint

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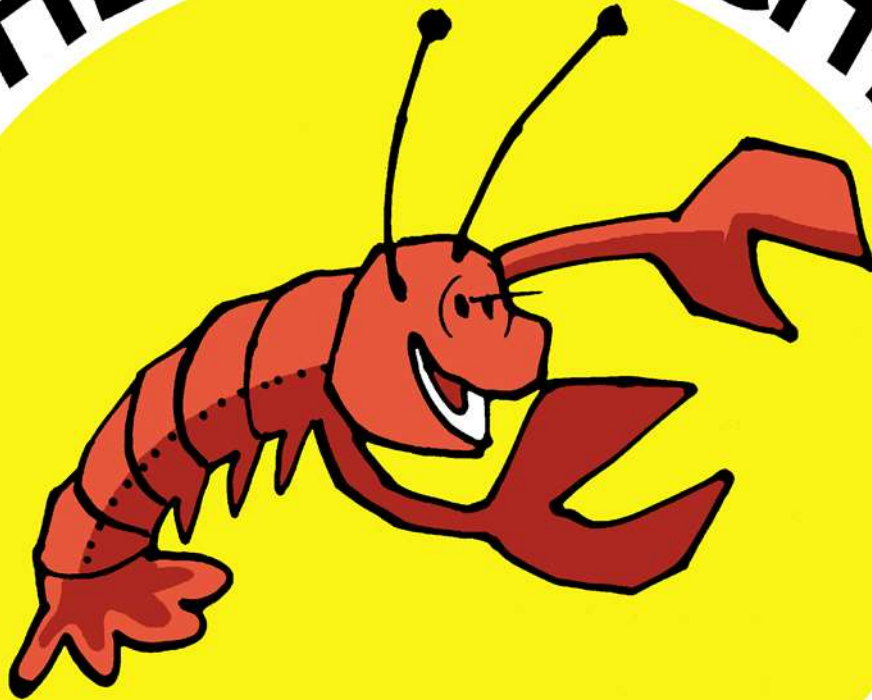
December 2012

Stone Soup by Jan Eliot

7/31-8/2; 9/3-9/14/2013

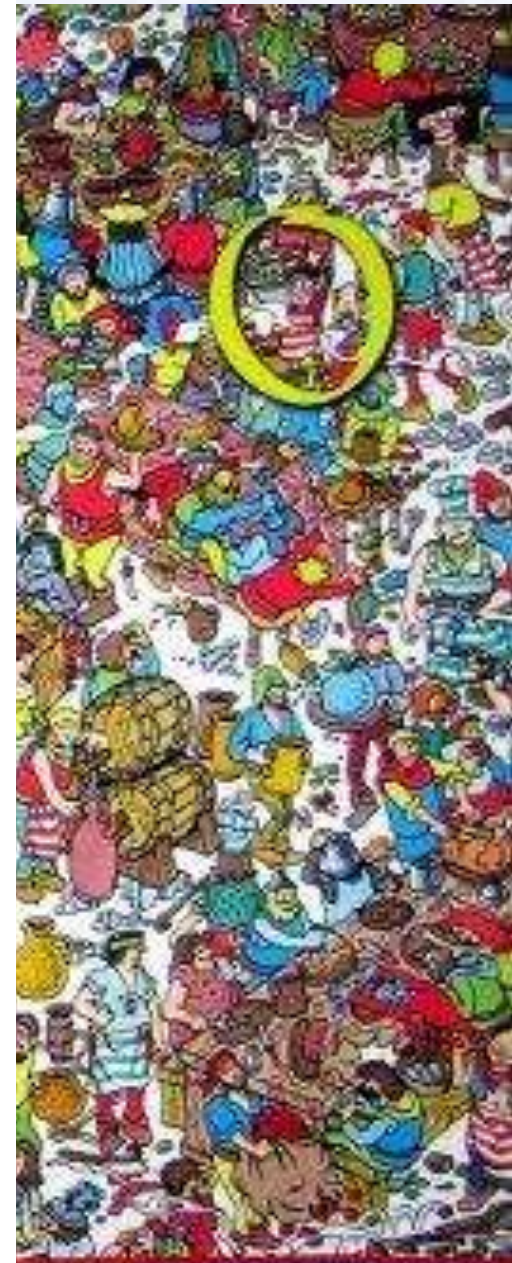


WHERE'S PINCHY?



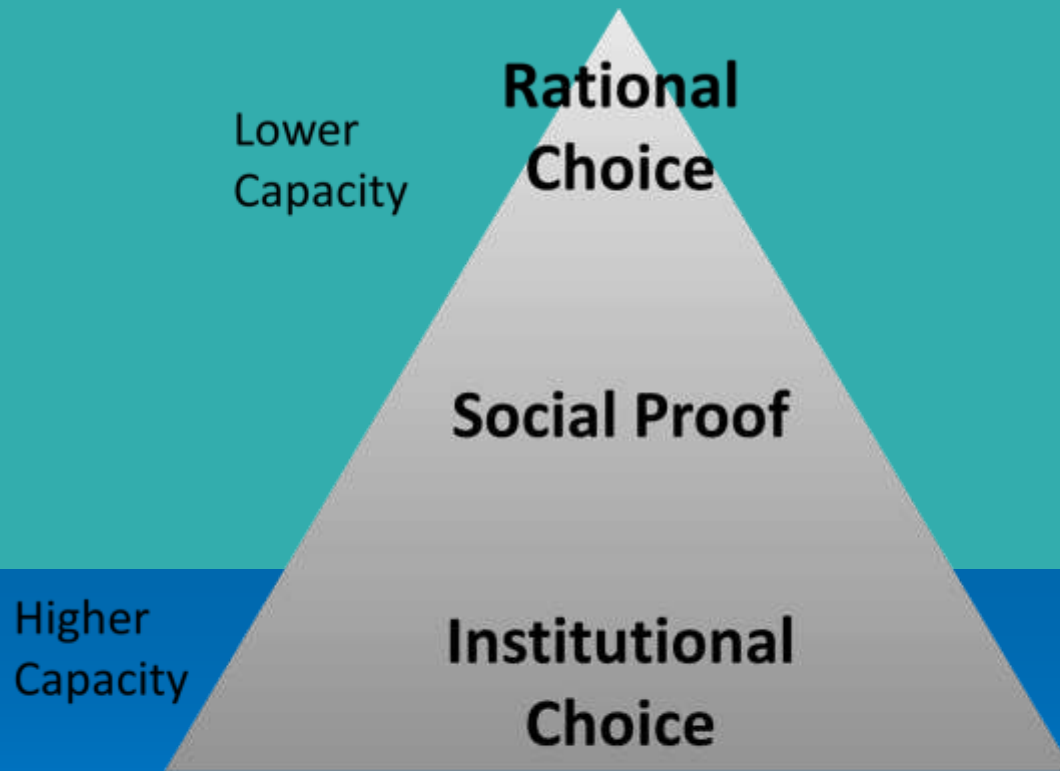
Stone
Soup

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TIN HANDFORD

What influences people's behavior?



Depicted by Chan and Lam, after R. Anderson 2012 (10 Myths to Behavior Change)

Human Capacity to Act (HCAM)



Classroom Culprits? Invasive Crayfish Threaten Western Waterways

- http://www.pbs.org/newshour/bb/science/jan-june11/pledge_03-10.html
- <http://wardsci.com/article.asp?ai=1346>

Top Reported Organisms Reported by Teachers that are regarded as Invaders

